The Builder.

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The Hall of the Charterhouse.....Drawn by Mr. A. E. Brooker, A.R.I.B.A.
(R.A. Silver Medal for perspective drawing.)
House in Gloucestershire.....Mr. A. E. Bullock, A.R.I.B.A., Architect
House in Parktown, Johannesburg.....Mr. R. Weir Schultz, Architect.
Banqueting-Hall, Park Hotel, Cardiff.....Mr. H. D. Richter, Architect.
Illustrations of "Architecture of Rome and North Italy".....From Photographs by Mr. Alan Potter.

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Parenzo and Its Basilica (*concluded*).

HE architect, Sig. Tommaso Natale, discovered a mosaic above the triumphal arch a few years ago, which had been hidden by the late Renaissance "improvements." It consisted of a long strip of gold, on which the Apostles stood clothed in white robes gemmed with crosses, six on each side of a central figure of Christ, who was robed in purple and seated on the globe. He had a cruciferous nimbus, blessed with the right hand, and with the left held an open book inscribed *EGO SVM LVX VERA*. On the right were S. Peter with the keys, S. Andrew with a book, S. James with a crown, SS. Bartholomew and Thomas with books, S. Simon with a crown; on the left S. Paul with two rolls, S. John with a crown, SS. Philip and Matthew with books, S. James Alpheus with a crown, S. Jude with a book. The names were inscribed above the figures, and a band of dark red with golden gems surrounded the whole. The heads of Christ, SS. Bartholomew and Matthew were damaged by brackets belonging to the roof, and the whole of the mosaics have been restored by a Roman mosaicist.

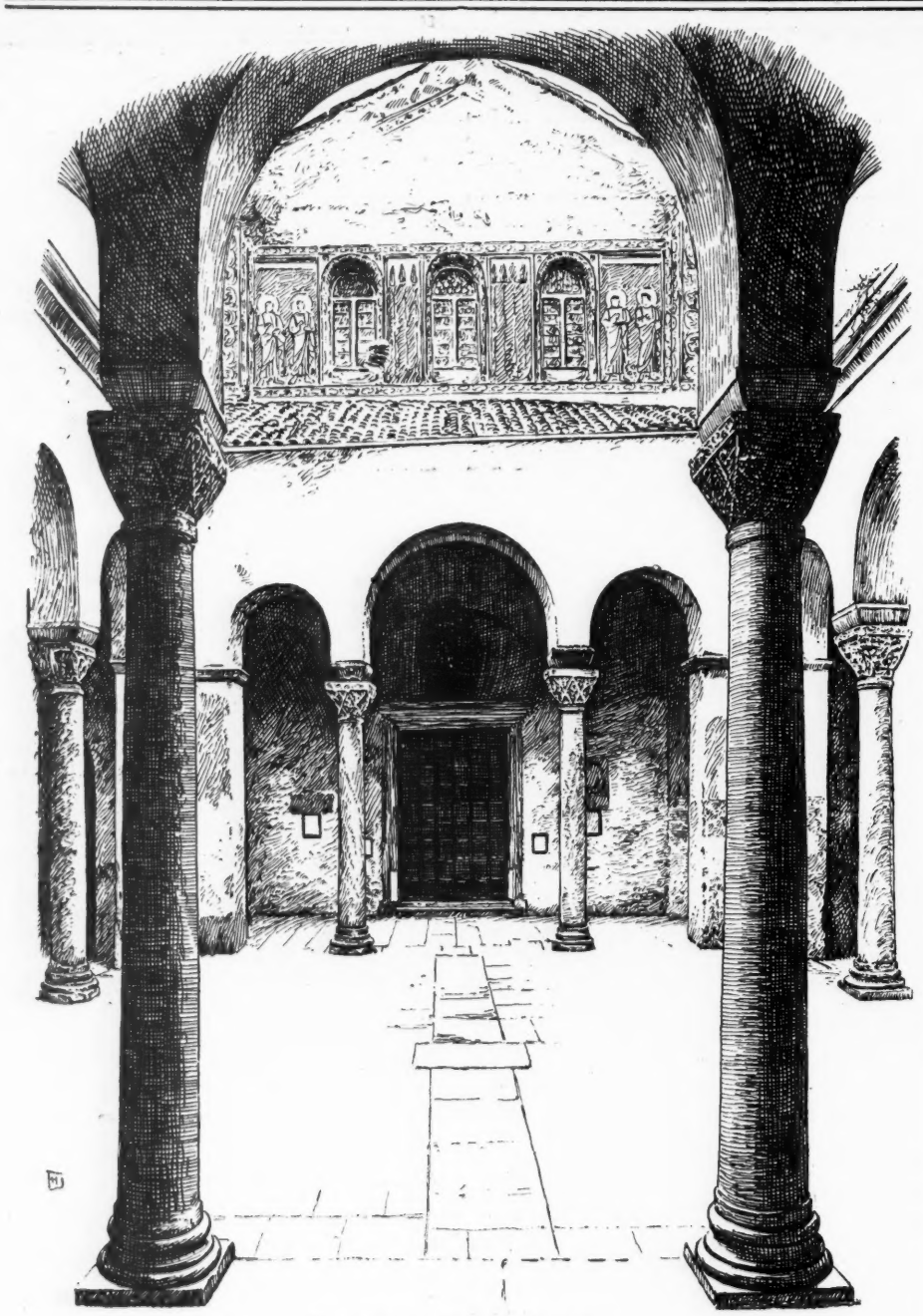
The altar of Euphrasius was retained until the time of Bishop Folcherius (1208-20), who substituted a larger one to contain more relics. A few years after Bishop Adalpert raised the level of the choir about eight inches and the altar correspondingly, reconsecrating it May 8, 1233. The present ciborium was put up in 1277 by Bishop Otho, using the same columns and caps. It has slightly pointed arches, with mosaics in the spandrils. On the west side is the Annunciation, and on the other three sides heads of saints in circles; and the vault is also covered with mosaic. A long inscription in Lombardic letters gives the date and the name of the donor.

The pala was made in 1452, and cost 600 ducats of gold, half of which the commune contributed by selling useless church objects, while half was paid by Bishop Giovanni, who was Parentine by birth. It is a fine work in the style of the early Renaissance, with a Virgin and Child in the centre, S. Mark to the right and S. Peter to the left, and outside of them a bishop with an elaborate crozier and the patron saint holding a model of the town. The figures are within classical niches, the sides of which vanish in perspective towards the central point. In the sacristry is a picture by Antonio da Murano in a very bad state, the gesso having scaled off in places. It is in the original frame, which has thus lost a good deal of its ornament. In the centre is the Madonna and Child, flanked by two full-length saints on each side, SS. Francis and Nicholas, S. Simeon and another male saint; above the Virgin is a half-length of the dead Christ, and above the other saints half-lengths of SS. Mary Magdalene and Christopher, Catherine and Anthony. It is signed Antonius de Muriano, 1448.

In 1847 Bishop Peteani made great alterations. The high altar was rearranged to face towards the east, and the relics of SS. Giuliano and Demetrio were then found in a square chest of white marble on which was written that it was made by Adalpert and the date of consecration. He made the present ambo of Euphrasian cancelli from the choir and six columns which had been between them or had belonged to the font, and also built the chapels to right and left of the nave.

The present pavement was laid down in 1880. Some inscriptions from the pavement of Euphrasius were preserved in the baptistery. The triapsidal chapel with the elliptical ante-room, beyond the sacristy, was a relic chapel, and is Euphrasian, and a mosaic of the date of the second basilica was found here 5 ft. below the suface; but the vaulted passage by which it is approached is of the XIIIth century, while the superstructure of the chapel is Venetian, added to assist in the defence of the place from this side.

The plan of the atrium is Roman, not Byzantine like those at Grado, Ravenna, and Constantinople. These have a portico and the baptistery at the side, not joined to the basilica. The difference in height between narthex and atrium was seven or eight inches, the atrium being the higher. Along the façade a herring-bone pattern pavement of white and red tesseræ was found, which continued further to the north. A certain test of the age of the different parts is the quality of the mortar used.



The Atrium, Parenzo Cathedral.

By this it is proved that the eastern apse is purely Euphrasian, the foundations being set in mortar of the kind used by him, and that he kept the atrium pretty much as it was, only adding the columns with Byzantine caps. The baptistery on the other side was very little altered. It had a floor of stucco and was circular internally; a section was found between the campanile and the door from the piazza into the atrium. Euphrasius made it octagonal and put marble slabs round the font, the marks of which still remain; while a few fragments were found, together with some gilded and coloured tesseræ, which show that it had mosaic enrichments. The gable of the church was also decorated with mosaic, the seven apocalyptic candlesticks between the windows and figures at the sides within a border. This has been restored. Above the feet of Christ may be traced, seated on the globe in the centre, and folds of the draperies of figures at the sides. There are scarcely any tesseræ remaining, but the lights of the drawing appear in relief. The baptistery is used to store portions of the early buildings which have been discarded. Here is the Euphrasian altar, standing on a slab of marble with sunk squares in the corners for the bases of the ciborium columns, and enough of the chancel of the choir, panels, and colonnettes to make a restoration, though it is equally likely that they belonged to such a baldacchino above the font as still exists at Cividale and once existed at Cittanova. Here are also two caps from the IVth century church, fragments of mosaic pavement found in mediæval tombs, and a good many pieces of VIIIth and IXth century carving.

The survival of the Constantinian plan is explained by the slight alterations which Euphrasius made. The walled-up doors in the baptistery show that it was not an isolated building, and there were probably attached to it dressing-rooms for the two sexes, waiting-rooms for the baptised and their relations, etc.; and an arch of the IVth century near to which the herring-bone pavement runs was probably the entrance to a portico joining the basilica to the baptistery or to the "consignatorium," where the bishop anointed the neophytes directly after baptism, before they made their solemn entry into the church. This building still exists as the "cantina" of the bishop's palace—a true basilica, with a nave almost square, with a double-walled apse on the north and corridors east and west, preceded on the south side by a portico. In front was an oblong court. The walls are all of Roman work, and the outer apse has an arcade on pilasters, with large arched windows. Two or three years ago repairs to the roof led to the discovery of windows in the inner apse. Round the doors the work is Euphrasian. The corridors were spanned by arches, which are now built up, and thus make small rooms. There was a second story, and this was the bishop's palace; but the second floor of the west wing is mediæval, and it is probable that the great hall was then made by dividing the basilica horizontally: After the custom of anointing the newly-baptised in the *consignatorium* was abandoned, it became the chapel of S. Nicolò, then of S. Mary Magdalene, and the original use was quite forgotten.

The city was called "Julia Parentium," from the colony of legionaries sent by Augustus. It paid equal tribute with Pola, the capital of the province. Drums of columns of the temples of Mars and Neptune are still preserved, and a portion of the podium and steps serve as the bases of houses. The temples were destroyed in the XVth century, the materials being used to construct the quay. The site of the amphitheatre is betrayed by the line of the houses built on its foundations, but there are no remains of Roman work visible. The Casa dei Santi in the Via Predol probably occupies part of the area of the convent and church of S. Cassiano. There are two figures on brackets between the windows on the first floor which appear to be late XIth century. Reliefs of the Xth century are encrusted in the wall of a house built on the site of the ancient church of S. Peter.

There have been three lines of walls: Roman; that completed about 1250 under Patriarch Warner of Gillach; and a third commenced in the XVth century on the same lines but a little larger, leaving an alley between the two. In the XVIIIth century the circuit was about a mile. There were two principal gates, the Porta a mare and Porta a terra, and two small side ones made for the convenience of the inhabitants. It was divided into four Rioni: Pusterla, Porta Nuova, Marafor, and Predol. The square tower flanking the Porta a terra was erected in 1447 under Nicolò Lion; he signs it with initials and coat of arms beneath the panel of the Lion of S. Mark. At the bottom of the frame is an inscription giving the name of the architect, "Mag. Johannes de Pari Tergestinus," and of his son Lazarus, the sculptor, also the date. Another work of his was the church of S. John Baptist at Volciana on the Carso, the architrave of which bore his name and the date 1429. It has been rebuilt. The round tower dates from after the incursion of the Turks into the Carso in 1470, built under Pietro da Mula, 1474. The lion on the Porta a terra bears the inscription, "facite justiciam et dabo pacem in finibus vestris." On the Porta della Campana the length of dagger which was allowed is marked, and the town still preserves one of the "Bocche dè leoni" which were used for secret denunciations. The communal palace was built in 1270, one year

before Parenzo gave herself to Venice. Games of cards and dice were allowed under its portico and in the loggia, so that the players were under the eyes of the guards. The *canonica*, built in 1251, a fine piece of Romanesque civil architecture, was converted into a store for tithes of wine, corn, oil, and fruit by the chapter in the XVIIIth century. It has now been restored, with the entrance to the atrium of the cathedral which adjoins it, and looks much younger than its years.

NOTES.

The Channel Tunnel.

WITH the exception of a few enthusiasts, we believe that the people of this country are agreed upon the wisdom of the decision made by the Government to oppose the latest attempt to construct a tunnel between England and France. Whether or not the dangers of such a work from the military standpoint are such as could be amply and satisfactorily guarded against, there is not the least doubt that a loophole of the kind in our natural frontier would create a feeling of insecurity which, as the Prime Minister said, might lead to a constant demand for increased naval and military expenditure. It has never been shown by the promoters of the scheme that the tunnel would be of any real benefit to British trade and industry, and the enormous cost of the work must have proved a serious obstacle to its employment for the transport of goods. With alternative and competing routes between London, Harwich, Queenborough, Dover, Folkestone, Newhaven, and Southampton on one hand, and various Continental ports on the other, it would be virtually impossible for the tunnel to capture a very important proportion of the Channel freights. As for exports, the distance of our chief industrial centres from Dover is so great as to put that place out of count as a point of departure, as cross-country railway charges would be prohibitive. We hope that the last has been heard of the Channel tunnel for all time, and feel sure that our friends in France will not question the wisdom of the decision now definitely made.

The Metric System.

WHILE it may be quite easy to prove "freakish barbarism and intolerable anachronism" against our existing system of weights and measures, it is a very different matter when attempts are made in the direction of reform. From nearly every point of view the superiority of the metric system is obvious; but there is one important exception; and the House of Commons regard the difficulty and cost of enforcing its general adoption as too enormous to outweigh the advantages. A formal inquiry seems to be thought desirable, though we imagine it would result in a reiteration of the recommendations of the Select Committee of 1895, which reported in favour of compulsory adoption of the system, after a probationary period. Last Friday's vote showed a majority of only thirty-two against the proposal, but an appeal to the country—which would be essential before such a drastic measure became law—would reveal a far greater preponderance of the community averse to it, at the present time. And after all, whatever may be the view of the scientist and the schoolmaster, the people who have to use the weights and measures—whose wages rates, housekeeping economics, and whole industrial life are bound up with the question—are entitled to an opinion. It was generally understood that the cotton and engineering trades were strongly against the proposed change, but the statement of a Manchester member that 80 or 90 per cent. of the engineers of this country are opposed to the metric system, and that in the case of this industry alone the cost of the change would amount to 50,000,000*l.* sterling is, to say the least, very startling. Our trade in foreign markets is undoubtedly handicapped through the metric system not being used in this country, but in view of the violent dislocation of home industries which would accompany compulsory change, it would appear that the watchwords of the reformers must still be patience, perseverance, education.

The Canals Commission.

AFTER presentation of the railway view of canal traffic by the general manager of the Great Western Railway, as mentioned in our "Note" of March 16, the Royal Commission on Canals and Waterways have had similar opinions from the managers of the Midland and Great Northern Railways. All these witnesses are convinced that quick transit is an imperative condition if traders wish to be prosperous. They seem to be quite grieved to think that canals cannot compete more successfully with railways, and to come reluctantly to the sad conclusion that expenditure on canal revival would only be waste of money. Following these disinterested and despondent witnesses come others of more selfish and hopeful character. Mr. G. H. Kenrick, of Birmingham, for instance, finds as the result of inquiry that goods for export, as well as coal and iron, would be sent very generally by canal if the present rates were reduced and better facilities were offered, and that goods for home consumption would be sent in large quantities between centres such as Liverpool, Manchester, Leeds, Bradford, Birmingham, and London. Mr. J. S. Taylor, chairman of the Birmingham Chamber of Commerce, considers the present disuse of canals to be due to inefficiency and lack of facilities for through traffic. Mr. Jeans, secretary of the British Iron Trades Association, said that his organisation favoured the project for four great canals connecting Hull, London, Liverpool, and Bristol with the chief manufacturing districts. His belief is that if the canals were made really competitive routes against the railways the prosperity of the iron and steel industries would be greatly increased, with corresponding advantages to the national industries generally. There is reason in the contentions of these witnesses, who are surely better qualified than the managers of railway companies to speak for industrial interests.

The Panama Canal.

A RECENT letter of President Roosevelt to the Isthmian Canal Commission announces the fact that only two of the tenders submitted, on the terms mentioned in our Note of February 9, were thought worthy of consideration. The objects of the Government were to secure the services of the best contractors in the country at the least risk to them and at the least expense to the country. Neither of these objects was promised by the tenders received, for each of the firms had made financial arrangements such as would have left them as contractors with a comparatively small proportion of the profits; while, on the other hand, the Government would have been placed in the position of paying a high percentage for the use of capital which they could have furnished at a much lower rate. As if this fiasco were not enough, Mr. Stevens has resigned the position of Chief Engineer to the Commission, and Major Goethals, an army engineer, has been appointed in his place. The next things to be done are the preparation of new contract conditions and fresh invitations for tenders. How long it will be before work is commenced in earnest we do not venture to suggest. We only hope that the delay may give the American people an opportunity of reconsidering the present intention to make a lock canal in spite of the extra cost involved by a sea-level canal. In a work of this kind it is very bad policy to accept an inferior project simply because it will cost less money, and be more quickly executed, than the only scheme which can be perfectly satisfactory.

Dover Harbour.

AFTER completion of the Admiralty Pier extension at Dover it was observed that during the ebb tide a strong current ran across the western entrance to the National Harbour, an effect that became more and more noticeable as the southern breakwater grew in length. The development has doubtless been carefully watched for some time past by the Admiralty and their professional advisers, but no decision was made to provide a remedy until after the stranding of the cruiser *Duke of Edinburgh*. Of course, it was well known that the harbour had been rendered unsafe for large passenger steamers by the narrowing of the entrance, and that the risks were so brought home to the Hamburgh-American Company by the accident to the *Deutschland* that the directors decided to abandon Dover as a port of call. Still, no one expects a Government department to pay much attention to the troubles or experience of mere traders. So the Admiralty determined in their own good time to send a battleship and a cruiser to Dover, so as to give two of His Majesty's ships the chance of damaging themselves. The attempt was only partially successful, as the more costly of the vessels managed to get safely into port. However, the upshot is quite satisfactory. The Admiralty now believe in the truth of their own warning to mariners that "Dover is unsafe for large vessels," and they have promptly made arrangements for the further extension of the Admiralty Pier by some 300 or 400 ft., so that the dangerous cross-current may be diverted from the present western entrance.

The Assuan Dam. As WE have previously stated, the main reason for delaying the addition of masonry to increase the height of the Assuan dam, and thereby to double the capacity of the reservoir, was the serious erosion taking place in the bed of the river below the sluices. There was, however, an alternative scheme for providing the additional supplies of water, namely, the construction of an entirely new reservoir above one of the cataracts in the Soudan. It now appears, however, that Sir Benjamin Baker and Mr. Webb have decided that no practicable site is to be found. Consequently the Egyptian Government have decided to proceed with the work of raising the Assuan dam, at the estimated cost of about 1,500,000*l*. The ultimate benefits to be derived from the additional supplies of water are the cultivation of nearly a million acres of land now useless, the capital value of the land, the taxes to be levied after cultivation has been effected, and an increase of the cotton crop to the extent of between 3,500,000*l*. and 4,000,000*l*. Against these substantial advantages archæologists will have to set off the complete annual submersion of the Philæ temples and the partial submersion of all the temples on the banks of the Nile from Assuan to Wadi Halfa. We may be sure that M. Maspero, the director of the Antiquities Department, will be authorised to do all in his power to prevent injury to the buildings affected, and as the completion of the new works will require a period of five or six years there will be abundant time for the adoption of such protective measures as may be found necessary.

The Clergy and Housing Reform. IT is no doubt a sound maxim to get assistance from every quarter, and, therefore, the National Housing Reform Council were probably well advised to send a deputation last week to the Archbishop of Canterbury and the Bishop of London. They could not have been more cordially received, and from the speech of the Archbishop one would imagine that the clergy of the Church of England were engaged on a perfect crusade in favour of Housing Reform. "They had in Convocation," he said, "a number of men who were not merely experts on these subjects, as to some extent every parish priest in a large town and in rural places also must be, but who were burning with zeal about it." Fine words butter no parsnips, and we shall be anxious to see whether the clergy generally take up a vigorous attitude in regard to housing reform. For if the truth be told, the clergy generally have hitherto been passive on the subject. They do not in rural districts urge on improvements, lay complaints before local authorities, and so forth. They stand much on one side, regret and preach against immorality, but take no active steps to impress on land owners that they should house their workmen well, and prevent crowding of the sexes. If the Archbishop wishes to follow words by deeds he should issue an address to the clergy on this subject, urging them to lose no opportunity of taking action in support of any and every measure for the improvement of the housing of the people.

Liability for Accidents in Buildings. THE case of Malone *v.* Laskey, which was decided by the Court of Appeal last week, shows that persons who are injured by accidents in buildings should be careful whom they sue. In the case in question A was owner of the building, B was the lessee, and C was sub-lessee, and plaintiff was his servant. A, on the information of B, though without being under any liability, employed a contractor to strengthen the support of a cistern. This later on fell and injured the plaintiff, who brought an action against A. The Court decided that as there was no contract between A and the plaintiff the latter had no right of action. We assume that there was some contract which prevented a right of action against the immediate lessees, but the case shows that if the owner of premises does work to them without being under a legal contract so to do, he is not liable for injuries to another person. But at the same time it is unwise to do work without being bound to do it by any contract, and in the case in question A was brought into legal proceedings by an act of good-nature.

The London Building Act, 1894. THE case of South-Eastern and Chatham Railway Company *v.* London County Council (the *Builder*, 22nd inst.) is one of importance. Under sect. 22 subsect. (1) of the London Building Act the Superintending Architect had defined a building line in Crystal Palace-parade. The railway company owned the land at one side of this street, and had erected, or were about to erect, a coal office on their land. The railway company, under sect. 25, had appealed to the Tribunal of Appeal against the decision of the Superintending Architect, but the ground of their appeal had been that the building line would infringe their rights under sect. 31, which provides that nothing in this part of the Act shall affect the exercise of any powers conferred upon any railway company by any Act of Parliament for railway purposes. The Tribunal of Appeal had allowed the appeal and had set aside the certificate of the Superintending Architect. The Divisional Court have set aside this decision of the Tribunal of Appeal on the ground that the wrong procedure had been adopted. The Court held that the certificate of the Superintending Architect as to the building line did not affect any of the powers conferred by Parliament on the railway company. If subsequently the company was summoned for infringing that line, then before the magistrates they could set up their right. The case of Elliott *v.* London County Council referred to in the argument was decided on different grounds under different sections. The question in that case was whether under sect. 84 a licence was required for a wooden structure erected on the railway company's own land to be used in connexion with the traffic, and it was held to be exempt under sect. 86.

Explosions Beneath Roadways. AN interesting case of the production of a liquid alloy of potassium and sodium by the action of electricity escaping from a defective cable beneath a roadway was recently discussed by Dr. Bassett before the Society of Chemical Industry. The cable was supplying power to a motor at 460 volts, and the current was carried by two thick insulated copper cables, one positive and the other negative. These were laid about an inch apart on wooden bridges, in a wooden trough, which was then filled with bitumen. Only the negative cable was affected, and the leakage occurred at a spot where two parts of the cable had been joined. Investigation by Dr. Bassett showed that the alloy was formed by electrolysis of water containing potassium and sodium salts, which had come within the range of influence of the electricity escaping from the defective cable. A considerable amount of hydrogen in the gaseous form must have been formed at the same time. The alloy when brought in contact with water emitted small flames, due to the decomposition of water and ignition of the liberated hydrogen. Dr. Bassett suggests that many of the explosions which have occurred in the neighbourhood of electric light mains, and which have been attributed to accumulations of coal-gas, have been due to accumulations of hydrogen formed by electrolysis. Ignition of the explosive mixture of hydrogen and air may occur in the absence of an electric spark or a match, if potassium or sodium, or an alloy of these two metals, has been produced by electrolysis.

Rating Light Railways. THE Wakefield and District Light Railway Company *v.* Mayor of Wakefield is a case of some importance on the rating of light railways. The Court of Appeal have now decided that sect. 12 of the Light Railways Act, 1896, applies the provisions of sect. 211 of the Public Health Act, 1875, by which "the occupier of any land . . . used only as a canal . . . or as a railway constructed under the powers of any Act of Parliament for public conveyance shall be assessed in respect of the same in the proportion of one-fourth part only of the net annual value thereof." The court held that sect. 12 of the Light Railways Act, 1896, with the exceptions mentioned in the section itself, applied the general legislation applying to railways, and that the Light Railway Company had an occupation of land used only as a railway, for although the rails were laid on the public road, they had an exclusive use of the rails so laid on the road.

Society of British Artists. THE order of numbering in this year's exhibition commences with the two small galleries where the water-colours are hung, the effect of which is to start one with a good impression, for there are many good things in these two rooms, to the first of which the President contributes two excellent sketches of Spanish scenes (9 and 13). Mr. E. Noble's "The Goatherd" (1) is a fine drawing; and in the same room Mr. Wallace Rimington has a very good night scene (41); Mr. Burleigh Bruhl a clever snow scene with a figure—"Frozen Out" (45); Mr. Haité's landscape "The Fall of the Leaf" (47) is a success in a class of subject he has not generally treated. In the second room Mr. E. Collins, in "The Peacock and the Magpie" (82), has

treated brilliantly the subject of a kind of parliament of birds; Mr. T. A. Falcon gives, under the title "Proud Summer" (97), a good decorative study of "Sunflowers"; and there are other things well worth notice, including the small sketches on the screen. Unfortunately the large room does not do much to bear out the promise of improvement; there are the usual number of pretentious or unpretentious commonplaces, with a few exceptions such as Mr. East's "A Winter's Dawn" (271); Mr. Foweraker's large Spanish landscape (189), which is powerfully characteristic of the country but with a very odd-coloured sky; and Mr. Lenfestey's "A Solemn Stillness" (192), a scene of dark masses of trees around a pond, which is an effective and poetical work. Night effects seem rather to abound; Mr. Elphinstone's seapiece of a steamer towing a ship at night (241) is not unsuccessful. Mr. R. Fowler's large landscape "A Chill October Evening" (222) is a fine composition with unsatisfactory colour. "Breezes are Roaming" (218), by Mr. A. Maclean, is a good seapiece with a fine sky; and Mr. Ayerst Ingram contributes a capital small sea-piece, "An Easterly Wind" (256), besides another in one of the smaller rooms. Mr. Foottet exhibits his new patent system of making pictures in "The Passing of Spring" (228), which is better than some eccentricities by the same hand which have been seen in previous exhibitions; it is not nature, but it is an effect, and successful as such. In the south-west gallery Mr. Hal Hurst's "On the Dunes" (315), a girl and child in a strong wind, is the one thing in this room that is entirely successful in its aim, though the aim is not a very high one; it is the kind of art that may be called *chic*, but undoubtedly clever as such. Mr. J. D. Ferguson's "The Fur Hat" (351), in the next room, is one of those effective pieces of raw brushwork which pass for portraits nowadays—also good of its kind.

The L.C.C. and District Surveyors.

THE District Surveyors' Association have taken the opportunity of the election of a practically new London County Council to draw attention, in a Memorial to the Council, to the important question of the status and terms of appointment of the London District Surveyors. Recalling the fact that previous to 1888 a District Surveyor could be and generally was a practising architect, and that since that date all District Surveyors have had to surrender their practice on appointment, the Memorial submits "that this system has not stood the test of time, but is now shown by the light of experience not to have been a success."

"Formerly many men of the highest eminence in the architectural profession, including no fewer than five who subsequently became Presidents of the Royal Institute of British Architects, presented themselves as candidates for the office; but men of such standing are not willing to exchange a successful or promising practice for a District Surveyorship under existing conditions.

During the last three years of the existence of the Metropolitan Board of Works, viz., from February 28, 1885, to March 3, 1888, seventeen new District Surveyors were elected. At these elections as many as thirty-eight candidates have presented themselves, the average being thirty-three; but upon the institution of the restriction on private practice in 1890 the number of candidates fell to little more than half that number; many of the best qualified men would not subscribe to the conditions."

We have always disapproved of the new condition, which was humourously described by its originators as a scheme for "the elevation of the Office of District Surveyor," while its obvious effect is to the contrary. We hope the present Council will give due consideration to the Memorial of the District Surveyors' Association, and will undo the mistake of their predecessors in 1888.

THE ARCHITECTURAL ASSOCIATION.

AN ordinary fortnightly meeting of the Architectural Association was held on Friday last week at Tufton-street, Westminster, S.W., Mr. A. Needham Wilson, Vice-President, in the chair.

The minutes were read and confirmed, and a number of nominations read.

The following gentlemen were also elected as members, *i.e.*, Messrs. R. F. Chisholm, W. C. Steljes, and H. M. Pett. Mr. B. A. Elphicke was reinstated.

Donation from the Royal Institute of British Architects.

The Chairman said he had great pleasure in proposing that a cordial vote of thanks be accorded to the Royal Institute of British Architects, who had been generous enough to give a sixteenth annual grant towards the educational scheme of the Association. He was sure that all would endorse the vote of thanks to the Institute for their practical sympathy in the work of the Association.

The vote of thanks was carried with acclamation.

The House List.

The Chairman then read the following house list for session 1907-8:—

As President: *Mr. Walter Cave.

Vice-Presidents: Messrs. Arthur Keen and Henry Tanner, junr.

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The Chairman explained that any additional names, should any members wish to propose them, should be submitted for nomination at the next meeting, and each name should be proposed by two members.

Sanatoria.

Mr. E. T. Hall then read the following paper on "Sanatoria for Consumptives," which was illustrated by a number of lantern slides and drawings:—

"The subject of sanatoria for the treatment of those suffering from tuberculosis is one to which great attention is being given throughout the United Kingdom by public authorities, because it is now realised that only by organised effort all over the country can any good be done to stem the advance of this disease. In an Association of Architectural Students we have not to deal with the medical side of the question, still less to treat of the statistics of death. The practical question for us to consider is, given the necessity for sanatoria, how can we best provide the buildings to accommodate the thousands of patients who will have to be treated.

It seems to me that the elucidation of this problem will be furthered if we see what has been done by other nations as well as by our own, and so I have endeavoured to collect plans and other particulars of sanatoria in Germany, Sweden, Holland, and France, as well as some in England.

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* Members of present Council.

To Germany is, I think, due the earliest recognition of the duty of the public to stem the growth of tuberculosis, the effect of which is to lower vitality, to deteriorate the race; and all over the German Empire there are hospitals and sanatoria in large numbers, subsidised or constructed by various States and by insurance companies, as well as those carried on by private enterprise. I shall exhibit on the screen a map of Germany, showing existing sanatoria, which will more forcibly illustrate what has been done than any words of mine.

Before, however, coming to the display of plans, I will ask you to note that in practically all cases elevated sites are selected with open prospects, broadly speaking, towards the south; that shelter from the northern half of the compass is sought; and that extensive areas for exercise are regarded as of great importance. Or, putting it in other terms, dry sites for building at bracing altitudes, aspects with the maximum of sunlight for patients' rooms, protection from chilling winds and sleet, and open-air living, are regarded as essentials for the reinvigoration of the invalid, while broad prospects are mentally stimulating, widening the interests in life, and inculcating hope in the future. Pine woods as a screen are much appreciated for their exhilarating resinous aroma, and the sandy soil on which they thrive is considered the best on which to be located.

As to the type of building selected for patients, you will presently note that there has been an evolution in this. The earliest sanatoria were ordinary houses; indeed, as is natural, patients were at first treated in what came readiest to hand. Given the essential requisites of location, all that was sought was a place in which patients could sleep; disciplinary treatment was relied upon for the rest. A reputation for the cure being once established, the buildings became larger as demands for accommodation increased, and many houses grew into hotels. Of such a type is Falkenstein in the Taunus Mountains, near Frankfurt, and Hohenhonef, near Cologne. An examination of these plans will show that they have in parts a central corridor, with rooms on each side, common to most hotels. Gradually the development of the sanatorium has led to a type with a corridor on the north and rooms on one side only, and of these we shall see many examples. Another branch of development has been the aggregation of small houses, first by the natural process of the acquisition of adjacent buildings, and later by a deliberate scheme of constructing small houses on the village principle, with central administrative buildings. The natural aggregation may be seen in Dr. Walther's colony at Nordrach, in the Black Forest; the artificial village may be seen at Montigny, in the North of France; and there are several in America, all for paying patients. A third type is the large hospital with wide verandas on the south side of wards, where the open-air treatment is practised by placing couches on the verandas, and on these the patients are reclined for eight or ten hours a day. As an example, I may cite Harlaching, near Munich. Another ramification of the same idea, even with buildings specially erected as sanatoria, has been the construction of what in Germany are called liegehallen, or reclining halls.

These are generally one but sometimes two-storied verandas enclosed on three sides, and open to the south; sometimes attached to, but often entirely separated from the building proper. They are very general in Germany, but I think this arises to a great extent from the design of the sanatorium itself. Most of these buildings on the Continent are of three or more stories in height, as though the military idea of a barrack was the motive of the design adopted, and as experience taught the managers that the patient must come out of his nightly domicile, and could not be going constantly up and downstairs, provision had to be, and was, made for his resting during the day in shelters in the open air.

Hospitals are necessary for any advanced stages of consumption, but sanatoria are more particularly intended for, and are more successful with, early-stage cases of pulmonary tuberculosis. While, therefore, a hospital of three or four stories may be justified where sites are limited or concentration is considered

imperative, sanatoria are better of one or two stories with verandas on the ground floor, and with such a type the liegehallen are, I think, unnecessary.

I believe, too, that the medical view is gradually coming to regard the treatment of keeping these patients lying down for many hours at a time as prejudicial to any permanent recovery and conducive to idle habits, and is in favour of regular and regulated exercise and employment, as in every way—physically and morally—better for the patient, and as educating him to become a more useful member of the community. The results obtained on these lines by Dr. Paterson in the Brompton Hospital Sanatorium at Frimley are most satisfactory, and should exercise an influence on treatment elsewhere.

From the sanitary building point of view, the long central corridor, with rooms on both sides, is not to be commended for patients, and even with one corridor sanitarians recommend that there should be ample windows in the outer walls of the corridor, with corresponding openings in the walls of the rooms, so that air may blow right through.

Of the relative merits of one and two-storied buildings this much may be said:—The one-story is the easier and better for patients; the two-storied in a large institution gives better concentration for the staff. The former in a permanent building is the more expensive when foundations, roofs, and sanitary apparatus are taken into account.

There are many advocates of the cottage type of sanitoria as tending to greater classification, but that is an argument only of weight where other than first-stage cases are dealt with. Of course, the cottage has its advantage for paying patients, because greater privacy can thus be secured.

Much is heard of the châlet type, or wood hut, for a single patient, and its trifling cost as compared with a permanent sanatorium, but the two cannot be fairly compared. It would be as reasonable to compare the cost of a soldier's camp of tents or huts with that of a depôt barrack—the one is temporary, the other permanent.

The wood hut is primitive, and although medical skill may in any given individual case produce as good results in the one institution as in the other, the essential difference remains so far as buildings are concerned.

The permanent sanatorium is replete with the latest outcome of civilisation—electricity generating-station for lighting and power, hot water and heating installations; an elaborate system of drainage; a laundry full of machinery; engine, and boiler-houses; an expensively-fitted kitchen; and large stores, permanent residences for medical and nursing staff, recreation and dining-rooms, laboratories for research, mortuary and post-mortem rooms. Its bath-rooms, closets, and other similar accessories are, to meet modern requirements, built with glazed bricks; the angles of all rooms are rounded, and other expensive finishings are required by the medical staff.

Such an institution is as costly as a private mansion of similar extent would be.

Two essential details in design are (1) that all windows or other openings shall be carried up to the ceiling, so that all parts of the rooms and corridors may be scoured with fresh air; (2) sanitary apparatus should be external to the building.

I think with such provision a minimum of 1,000 ft. for a single-bed ward is sufficient, and 9 ft. to 10 ft. is ample for height in such wards. Single-bed wards should be the rule, but two and three-bed wards are useful. In a hospital where all kinds of cases are taken it is different, and in these wards of eight to twenty beds are found.

Floors should not be laid direct on the ground, but should have a ventilated space beneath.

In rooms where windows are practically always open no ventilating flues are necessary.

In the designs which are exhibited it will be seen there are great varieties of plan. Some buildings are straight; some are T-shaped; some are crescents; some are like an inverted U, the centre straight, the arms opened out at angles from about 110° to 160°; some are cruciform. For moderate-sized sanatoria, say under fifty beds, I should give the preference to the open U plan. Care should be taken not to put too large a number of patients in one block or pavilion because of the danger from a large fire. If the building is more than one story in height, there should be, as far as practicable, no way by which the vitiated air of the lower story may ascend to the upper one.

I think the time has now come when we may profitably study the large number of buildings which will be shown on the screen.

Beginning with Germany, we have:—

Beelitz, near Berlin, designed by Herren Schmieden and Boethke; a large scheme, consisting of twenty main buildings and many smaller ones. The main pavilions are two-storied, E-shaped, and patients' rooms generally face south. At present accommodation is only provided for 308 patients.

Belsig, near Berlin, is for 125 patients. The building illustrated is a long two-storied building with axis east and west, the centre being recessed, the whole forming an interesting and picturesque group.

Badenweiler is four-storied, and in plan an inverted T, the base, with east and west axis, containing the patients' bedrooms, the perpendicular block containing the public rooms, etc.

Meschede is again a four-storied building with other rooms in the roof. On plan it is a crescent with southern aspect, and provides accommodation for 114 men.

Albertsberg, designed by Professor Tscharmann, of Dresden, for 121 men, is a large building with a main corridor running east and west, with pavilions at right angles, those on the south side forming single wards of ten beds, each lighted on three sides, with liegehallen between them. Those on the north side face east and west respectively, and contain on one floor six wards of three beds each, and one at the north-east of six beds. The public rooms are in the centre, the dining-room connecting the main building to another parallel block at the rear.

Edmundsthal, designed by Herren M. Haller and H. Geissler, of Hamburg. This is roughly H-shaped, the front block has two end pavilions, with windows on three sides, for twenty beds each, connected by a corridor having a liegehalle on its south side. A large central dining-hall connects this block to a parallel one at the rear, in which are four-bed wards with their own balconies. There are other pavilions for women and children.

Schreidershaw is again a lofty building, the rooms in the centre being in single file, those in the side blocks being in double file with a central corridor.

Melsungen, another lofty block, forming a very flat crescent, with centre liegehalle on the upper floor and large dining-hall behind.

Falkenstein, near Frankfurt, is four stories high. The nucleus of this sanatorium was a large private house, and its kitchens and offices are in the basement. It has accomodation for 120 paying patients of either sex, with seventy single and twenty-five two-bed rooms. Its plan has the public rooms in the centre, with an east and west axis, and two wings with axes south-south-east and south-south-west. It will be seen that there is a central corridor with some bed-rooms facing west, north-west, and east-north-east.

Ruppertshain, near Konigstein, is three stories in height, the main building crescent in plan. It contains 112 patients' beds, all facing towards the south—ninety beds for men, thirty-two for women. There are six six-bed wards, seventeen four-bed, and eighteen one-bed wards, all in single file south of a well-ventilated corridor. Its annexe has further accommodation.

The Volksheilstatte Krailing, near Planegg, in Bavaria, designed by Herr Michael Dösch, is for 120 patients. The slide shows that it has a central block with east and west axis and two wings with east-south-east and south-south-west axes. There are thirteen single-bed wards, fourteen of two beds, six of three beds, two of four beds, six of five beds, and two of six beds, but more beds are occasionally used to accommodate the maximum number. This is well planned, and is surrounded by pine woods, which, however, rather hem it in.

Harlaching, near Munich, designed by Herr Hartwig Eggers, is a large hospital for 212 patients. There are six wards of twenty beds, six of twelve, and some with single beds. It is E-shaped on plan, with the axis of the main block east and west, the arms north and south. In the main block, the long wards are lighted from north and south, but the south side is shaded by balconies or liegehallen of solid masonry, 12 ft. wide. This hospital is not exclusively for consumption.

It will be noted in most of these German sanatoria that the sanitary arrangements are most imperfect. Frequently, water-closets are in the heart of the building, in some cases three being in one room, lighted and ventilated by only one window, and having a door of access to the main passage.

Sinks and lavatories are as badly placed.

Switzerland.—There are, of course, many sanatoria in Switzerland, but I am only showing by four slides that of Schatzalke. It will be seen this is a long parallelogram of four stories, with a central corridor from end to end. The principal floor is largely appropriated to the public rooms.

In Sweden we have:—

At Stockholm, the large Consumption Hospital, designed by Mr. Wickman, by whose courtesy we are enabled to study the drawings kindly sent to me. It is a large place, ultimately to consist of eighteen blocks of buildings, containing in all 1,248 beds. Its author speaks of it as a hospital for treatment of consumption generally. There are three principal buildings, containing 384 beds in each, and those are in groups of eight to a ward. All wards are in single file, the corridor behind being wide and well ventilated. There are three staircases, and there is a cloak-room on the ground floor, a very useful accessory. In another building there are forty beds, in wards of two beds each. Two summer pavilions have twenty-eight beds in each.

At Osterasens, the sanatorium designed by Mr. F. Lilljakviet consists of one group of buildings, containing 104 patients' beds. In the centre is the administration, connected by four bifurcating arms to four parallel pavilions of one-story each, containing two six-bed, two four-bed, two two-bed, and two one-bed wards. I venture to think the defect of the plan is that the rear blocks look on to the back of the front ones.

Halahults Kronspark, designed by Mr. A. B. Kumlien, contains on three floors 102 patients' beds, with a central administration, having its axis north and south, and two wings facing south-east and south-west—one for men, the other for women. There are eighteen four-bed wards, the others being for two beds and one bed each. In addition to this main building, there are seven others, including two summer pavilions grouped around the first and largest.

The next slide shows a design for a fifty-bed pavilion. Its general scheme of plan has a central block, with axis east and west, and patients' rooms in wings having their axes east-south-east and west-south-west, a type corresponding to that of Planegg, with liegehallen beyond the wings. This has eight four-bed wards, eight two-bed, and two one-bed wards.

Here is another Swedish design for a sanatorium of twenty-five beds, with an L-shaped plan. It has four four-bed wards, four two-bed, and one one-bed ward.

Here we have another for twelve patients:—

In Holland, I am able to show the sanatorium of Oranje-Nassaus Oord, designed by Mr. R. Kuipers, which is a semicircle on plan, with rooms in single file and liegehallen at intervals, forming a part of the design. It provides accommodation for patients on two stories, the wards facing south, east, and west. There are excellent public rooms, the dining-room having windows on all sides. The picturesque grouping is shown in the views.

Hoog-Laren, designed by Mr. Ed. Cuypers, of Amsterdam, is a sanatorium for the city of Amsterdam. The building, of which the ground and first floors are shown, is straight with a central corridor. The ground floor contains the administration and the patients' recreation-rooms. The first floor contains eight single-bed wards, two four-bed wards, two six-bed wards, and two isolation wards of single beds, opening on to a central balcony. The dining saloon and offices are at the rear, and a corridor connects the two blocks.

France.—The Sanatorium d'Angicourt (Oise), designed by M. Balouet, stands in 320 acres of grounds, and when completed will have 328 beds in two patients' blocks. It will be seen that it differs in plan from any I have hitherto shown. It is, from a hygienic point of view, admirable in arrangement. Some of

the administrative buildings lie on an axis north and south. To the right and left, near the northern end, are two others, while right and left of the southern end are the detached patients' buildings. Each of these has a base with axis east and west, and wings with axes south-south-east and south-south-west. Each block contains 164 beds in four wards of eight beds, twelve of five beds, twelve of three beds, and eighteen of two beds. On the ground floor a galerie de cure, the equivalent of the German liegehallen, extends all around the southern three sides of the enclosing building. A glass corridor connects the building to the dining hall.

At Hauteville (Ain) is a sanatorium for the city of Lyons, at an altitude of 3,000 ft., containing 110 beds in three blocks of buildings (two stories high, with a basement), disposed on an arc of a circle open to the south-west. A special laboratory is provided for the study of the disease. The wards are of one, two, and three beds each. The baths, laundry, disinfector, kitchens, and dining-rooms are in the basement, a scheme open, I think, to grave objection.

Montigny-en-Ostrevent (Nord), designed by Professor Calmotte, of the Pasteur Institute, is of the cottage type. It consists of a series of pavilions or houses, each for two families, one of whose members is suffering from tuberculosis. Another block is for contagious cases, and there are laboratories, etc.

In England there are three sanatoria of 100 beds each, which I mention in chronological order.

"Heatherside," Frimley, in Surrey, belonging to and built at the cost of the Brompton Consumption Hospital, for the free treatment of the poor, designed by me; that at Northwood, Middlesex, belonging to the Northern Consumption Hospital, similarly for free treatment of the poor, the gift of Mr. Rudd, designed by Mr. Wheeler; and the King's Sanatorium, at Midhurst, the gift of Sir Ernest Cassel, Bart., for paying patients, designed by Mr. Percy Adams.

Frimley is two-storied, with a central block, having its axis east and west, containing the administrative offices, public rooms, and twelve beds for patients requiring special attention, and there are four radial pavilions, containing each twenty-two patients' beds. As far as I am aware, this is the only sanatorium of such a type. Every ward has a clear and undisturbed view of the open country, and the exterior has been designed to get away from anything like the appearance of a hospital, and rather to suggest a comfortable home. All wards are in single file, facing south, south-south-east, or south-south-west, with corridors on the northern side, and windows in walls, and partitions for through currents of air. The end ward of each pavilion is projected so as to afford shelter to the others from flanking winds, and there is a wide paved terrace to the south, so that patients' beds may be wheeled out. In lieu of fixed verandas, to which there are objections, there are rolling sun blinds available for shelter from the sun, but dispensable when there is no sun. The wards are forty-eight of one bed, eight of two beds, and twelve of three beds. The sanitary apparatus is all in detached towers. To the north of the patients' building are grouped the administrative buildings and recreation-hall, and it has been sought to give all these the maximum of sunlight and air.

Northwood.—This is not strictly a sanatorium but a country branch of the Mount Vernon Hospital. It provides for 114 patients, fifty-seven of each sex, and there are ten beds in most of the wards, but there are twelve single-bed wards. Its plan of the main building has a small base, having east and west axis, for officers, and two wings two stories high, east-south-east and west-south-west, with a wide paved terrace on the south, sheltered at the ends from the side winds. The administration is to the north. The general design is very pleasing in appearance.

The King's Sanatorium at Midhurst.—This contains 100 single-bed wards in one large building, three stories in height in the centre, two stories in the wings. All the rooms are in single file, facing south-south-east, and south-south-west, with corridors to the north of them. The dining hall, connected by a corridor, is to the north, and the administration and staff homes are in the west wing of this same block, the kitchen, etc., forming the east wing. Mr. Adams was fortunate in having a large sum of money at his disposal, and his open-air chapel is one of several novel and interesting features.

Next in size is the Pinewood Sanatorium of sixty-four beds, designed by Mr. F. Jones, for paying patients. It has a central administrative block and two detached two-storied wings, each containing thirty-two single-bed wards in single file, facing south-south-east and south-south-west. The dining-rooms, offices, nurses' and servants' quarters are to the north.

Design for Private Sanatorium.—This is a design of my own for a small private sanatorium of twelve beds, prepared for a conspicuous position where economy is not the ruling factor. It contains a small private chapel, and adequate staff accommodation for so small a building.

Infirmary Wards.—It may be interesting to guardians who own large infirmaries to show plans of the consumption wards, and provision for open-air treatment on the roofs of four pavilions, designed by me as part of the Camberwell Infirmary, where the medical results obtained with consumptive patients are most satisfactory.

I have not treated of the cost of the various sanatoria, because a comparison between cost in various European countries is almost impossible, the rates of wages and price of material differing very largely.

In England, again, so much depends upon the character of the institution, as stated in my opening remarks. A cubic basis of cost is again illusory because manifestly rooms of large cube are cheaper per foot than those of smaller dimensions. The cost per bed is that usually adopted, and this has varied according to the type of design, the scope of the institution, the locality, etc., but for high-class permanent sanatoria the cost has ranged from 350*l.* to 600*l.* per bed, and event to over 1,000*l.*

Now it is objected that the cost of all these institutions does not meet the want of sanatoria to be constructed all over the country for the million—in the literal sense—and it has been said that architects have yet to solve the problem of a design that can be carried out for complete institutions of varied size to suit local wants, at a cost that shall commend itself to the guardians of the public purse. Huts, on the one hand, are cheap enough, but are very temporary, and the maintenance is considerable. They have also special fire risks in wooded districts. At the other extremity is the solid building.

I have been giving a great deal of thought to the solving of the problem, and this has eventuated in the designs which will now be placed upon the screen.

The enclosing material, including that for floors, is non-combustible and impervious to rain and vermin. It is made in dry slabs of standard size, which are practically universal in application for the unit.

A sanatorium on these lines, complete with all essential administrative buildings to suit any required number of beds, with drains, fittings to kitchen and laundry, and water storage, can be erected on a suitable and reasonably accessible site at a cost of about 85s. to 105s. per bed, depending on its size. I call the design the standardised expanding sanatorium, because, if a small institution erected on these lines requires to be extended to meet growing wants, this can be readily accomplished by adding units to the wards and administration.

As examples of what may be done are shown:—One sanatorium of sixteen beds with its appropriate administration to cost about 1,680*l.*; one of thirty-two beds to cost about 3,170*l.* (see large plate of these two plans); and one of forty-eight beds to cost about 4,080*l.*

Now it should be said at once that these buildings do not pretend to compete with the large permanent sanatoria illustrated and described. Those have their place. They are the central institutions and places of research.

My aim has been different. In June, 1905, a profitable discussion of the whole subject took place in London, and Dr. Heron, in the course of his remarks, said: "All poor consumptives should be sent into sanatoria for their own sakes, and for the sake of the healthy community. This could not be done if sanatoria were built costing 200*l.* to 800*l.* per bed. A sanatorium well equipped for the service of the poor should not cost more than 80*l.* per bed."

I venture to express a hope that my application of his remarks will meet the want there expressed. The buildings suggested have in them nothing in common with the temporary wood hut or galvanised-iron buildings with timber construction and cavity walls and roofs. They have solid thin walls, roofs, and floors, with no cavities. They have smooth internal surfaces, avoiding the expense of plaster or wood covering. These surfaces may be left bare or may be distempered or painted. The drainage is taken to be for soiled water only, which, if no sewers are available, would be taken into cesspools, as at Nordrach, and emptied by closed suction-carts. A water supply is assumed, of course, to be available, either from public mains or a local pure stream or other source. Fireplaces in all rooms are provided to avoid the great expense of an engineering plant. A gas supply is required for heating bath water by geysers, and gas or oil may be used for lighting.

All the joinery required can be prepared in labour centres and carted on to the site ready for immediate erection. It will be noted that in all cases the sanatorium is divided into units of eight beds, each unit containing six wards with single beds and one with two beds. With a total of only sixteen beds it is assumed that the medical work will be done by a non-resident physician, the patients being in charge of a qualified matron with nurses. With thirty-two patients, a resident doctor is provided for, in addition to the matron, and the nurses and servants are increased. With forty-eight patients, quarters are provided for two medical men, a matron, and an assistant matron or housekeeper, with a larger staff of nurses and servants.

A small consulting-room and a waiting-room are also provided in all these sanatoria.

All the buildings are one-storied. All patients'-rooms face south-south-east or south-south-west; all staff-rooms face either south or east and west, so that all get ample sunlight. All rooms are approached by corridors or covered ways, protected from rain. All patients'-rooms have glass veranda shelters on the southern side. The open-air treatment is fully adopted.

In conclusion, I have to thank the following gentlemen for their great kindness in enabling me to show so many and varied drawings and photographs, both on the screen and the wall: Herren Muthesius, of Berlin; A. Schmahl, of Frankfurt; Ed. Cuypers, of Amsterdam; Roelof Kuipers, of Gravenhage; Gustof Wickham, of Stockholm; M. Lucien Bechmann, of Paris; Messrs. F. Wheeler and F. Jones, of London; and Mr. Percy Adams, who has also kindly lent me some of the German slides. I know you will appreciate this courtesy on the part of all, as it has added so much to the interest of the evening."

The Chairman, in inviting discussion, said they would all agree that they had had an extremely interesting and valuable paper, and that they were fortunate in having so much information put before them.

Col. Gerard Clark, called upon by the Chairman, said he should have much pleasure in proposing a vote of thanks to the lecturer, but at that stage he did not feel able to discuss the paper. He supposed that the price of the cheap sanatorium referred to by Mr. Hall did not include furniture or anything of the kind?

Mr. Hall: Oh, no! The price is for the building of the sanatorium.

Dr. Bulstrode said he was sorry he was not able to express any decided views on the question because of the official position he happened to hold; but he had listened with great interest to Mr. Hall's address, more particularly as he had visited almost every sanatorium that the lecturer showed upon the screen, both abroad and in this country. He was preparing a report to the Local Government Board on the question of sanatoria, and it would be seen that he could not express his own personal views in the circumstances. He had considerable sympathy with the attempts to provide sanatoria on cheaper lines than had been done hitherto. There was one sanatorium which Mr. Hall omitted to mention—inadvertently, no doubt—which was situated at Benenden, in Kent, at a cost of somewhere about 100*l.* per bed, and this

had been erected by certain friendly societies, and it was interesting because it was much on the same lines as the sanatoria which were erected in Germany. The reason why Germany was covered by sanatoria and England was not so much covered was largely owing to the fact that in Germany all working men obtaining under 100*l.* a year had to insure themselves against invalidity, against sickness, and against old age, and the insurance societies found it in their interests—and it was also in the interests of humanity—to prevent the people who were drawing sickness pay from arriving at a condition in which they would draw permanent invalid pay; and therefore directly patients developed consumption they were sent by the insurance societies to the sanatoria, and in this way the erection of sanatoria was very much encouraged. Possibly Mr. Hall's remarks at the beginning of his paper might have given rise to some misapprehension which he (the speaker) should be glad to remove. It was, he thought, generally believed that consumption was on the increase. As a matter of fact, it had been dying out in this country for the last fifty years, and there was every reason to believe that if the disease decreased at the rate at which it had in the previous fifty years, in the course of the next thirty years it would be as rare as leprosy; and therefore there was every reason to hope that with the precautions being taken, the rate of decrease might be increased. Even if we sat still, as we are doing more or less at present, the disease would probably die out as one of the effects of improved social conditions. Consumption was, more or less, a social manifestation, and as improvement in the condition of the people took place, the disease would, as far as could be seen, die away.

Dr. Glover Lyon expressed his thanks to Mr. Hall for his paper, and said that the lecturer seemed to have gone through every point relating to sanatoria. The lecturer had shown views of expensive sanatoria and also cheap ones, and there were several points arising out of what he said that would, probably, interest architects. One was as to the site. It was his impression that too much fuss was made about choosing the site, and the more fuss that was made the less satisfactory appeared to be the result. The King's Sanatorium site they looked for for two years appeared, when found, a very suitable site, but it proved to be really a very bad one. It was a long way from everywhere, supply and everything was very dear, and the thing that consumptives wanted as much as anyone else—*i.e.*, drinking water—did not exist, and the water had to be brought from a long distance. But they got water there where they did not want it, in the form of dense mists. Although the site is high up, with ideal pine-trees and sand, still, it had one of the worst climates in England for consumptives. The moral to be drawn was that a site should not be chosen without knowing the climate all through the year, and apparently sufficient trouble was not taken at Midhurst to find out what sort of atmosphere there was all the year round. Then, again, at Frimley, there were the ideal pine-trees and sand, but when he went to see the buildings, there were pools of stagnant water lying in the fields and by the road side, although the weather was not wet. [Mr. Hall: You do not mean on the site, but in the neighbourhood?] Yes. To go to a pine-tree and sand district, and to get mists and stagnant water was not right. One matter of interest was not mentioned by the lecturer, *i.e.*, the proportions of the accommodation wanted for men and for women. Nearly double the accommodation was required for men as for women. The women went home more quickly than the men, and there was no necessity to provide the same accommodation for the one as for the other. As a physician at a chest hospital for twenty-five years, he might say one or two words from a doctor's point of view as to what they should provide for when they built a sanatorium. At an ordinary chest hospital all kinds of cases of phthisis did best on the balcony, and there was a balcony at the Victoria Park Hospital where patients remained day and night in all weathers. Solid walls were in the way, and the ideal arrangement so far as the patients were concerned—and architects would look after the rest—was a room to sleep in with sides arranged so that the amount of air flowing through could be regulated. As a matter of fact, it was seldom that anything more than four posts and a roof were necessary. Sometimes, in very boisterous wind, it was, however, advisable to shelter the patients somewhat. At Victoria Park the wind blew along the balconies, and the patients liked it as a rule, though there was a limit to such an arrangement, and sometimes patients had to be sheltered from keen north and north-east winds. The same remarks applied to the dining-rooms; the ideal arrangement was four posts and a roof in ordinary weather; but there, again, a certain amount of extra shelter was desirable at times. With these ideas in mind, it seemed quite remarkable that palaces had been built in which to treat consumptives. As to the size of rooms, that was a matter of æsthetics; it had nothing to do with the necessities of the case. They had to give the patient the sized room he liked; that had little to do with the treatment. The bigger the room the greater the expense in building, and the greater the expense of maintaining it and serving it, and therefore it was important that the rooms should be as small as possible. As to chapels, there was a chapel at Northwood, and he was present at the opening services, and he was never present before at such a stuffy place. He was in entire sympathy with the last part of Mr. Hall's lecture, and he was sure that what had been said by the lecturer would have a great effect in helping on the solution of the important problem of reducing consumption. Mr. Hall had shown, what they could hardly have believed, that he could build a sanatorium for 85*l.* per bed. At Northwood, he was about right in saying that the building land, etc., cost about 200,000*l.*, and there were 100 odd beds. So it cost nearly 2,000*l.* to house a poor man who only needed a shed! That 200,000*l.* would have been enough to build, quite easily, sanatoria for the whole of London! It was not only a wicked waste, but it led to waste, for that sanatorium was enormously costly to keep in order and to serve. The kitchen was four times the area necessary, he should think; the passages were enormously broad, and everything was calculated to waste money in construction and maintenance. He was the physician to the second chest hospital in point of size of London, and there they could not get the money for a sanatorium at all; perhaps some of those present could help him.

Mr. W. A. Forsyth said the subject was one which appealed to everyone who tried to live a sanatorium life as far as possible and in the light of current opinion. He had studied the subject somewhat, although he had not built a sanatorium. He had visited many in the country; and he thought we suffered from too much architecture. As Dr. Lyon said, we want sheds rather than palaces; and at one time he (the speaker) went so far as to say that we only wanted a floor and a roof. These foreign sanatoria were like great hotels, and he did not think we should see more of them built; and the King's Sanatorium, he thought, was built from the vulgar desire to imitate these foreign palaces; there could have been no other object at the time. It was interesting to hear Dr. Lyons' condemnation of the site, and when they also heard what the cost per bed was the matter became alarming. Dr. Reinhardt said at the time that 200 lives might have been saved while the site was being acquired and the building erected. A defect in the King's Sanatorium—a defect in many of these plans—was to be seen at the end of all the wings, where staircases, lavatories, etc., were placed. The end room in a wing was the best position, for there one got two aspects, and a pleasing outlook. Mr. Hall realised that at Frimley, for he arranged at the end of the wings the principal ward. He (the speaker) was against wards, and he believed in one man one room. He had heard the patients coughing in a good many sanatoria, and the coughing of one patient must disturb all in a ward. Next to the King's Sanatorium, Northwood was the greatest failure. There were some big wards of eight or ten beds in them, and several of these beds were right at the back of the ward, along the corridor. Two years ago he was there, and he was told that the chapel, which they had heard was so stuffy, cost 40,000*l.*! That would have saved a good many lives had it been devoted to sheds. It was far too big an institution. It was interesting to know that we had few liegehalle in this country, and that was no doubt due to the fact that we were not overburdened with sun. As to Frimley, he noticed from the plans that the sanatorium was close to the Bisley-road, and, as they knew what went on at Bisley at certain times of the year, it occurred to him that that might be disturbing to the patients, and might send their temperature up. A good many sanatoria were in two detached blocks, with the entrance between the blocks, but he thought that was a bad plan, because the patients saw and heard all the arrivals and departures, and that was an unnecessary form of excitement. As to Mr. Hall's plans for cheaper buildings of a more flimsy nature, a good many people had looked into the subject of cheaper buildings. The great difficulty was the by-laws. Mr. Hall arranged for walls about 2½ in. thick—he had not told them the thickness; he had kept that secret—and the Local Government by-laws required the walls to be 9 in.! He should like to ask Mr. Hall about drains, for Mr. Hall was an authority on drains. In his description of a cheaper form of sanatorium, he referred to drains, but he (the speaker) thought it was time we got away from drains in such cases. We lost a great man in the late Dr. Poore, who so greatly interested himself in the matter of surface disposal of sewage, and if there was one place more than another where surface disposal was essential it was at a sanatorium which, when built on a porous soil, lent itself to that form of disposal. Dr. Lyon said something as to sites, and one of the earlier sanatoria in this country was Pinewood, near Wokingham, surrounded with pines, and with a brickfield close by! But site was not everything, for cures were made there. In that connexion he might mention what he had been told about Mount Vernon, in Hampshire, which two years ago was extended. In order to do this a number of patients were turned out into the grounds and put into tents, with the result that all the patients in the tents made rapid progress and left the hospital patients behind in the matter of recovery. The authorities were astounded, but they accepted a millionaire's gift, and a hospital was built at Northwood.

Col. Gerard Clark said that nothing could be done for the poor in the way of sanatoria until cheap buildings were erected. It was absurd to spend such a large amount of money in keeping out the air, which was one of the essences of the cure. Why big buildings, with expensive thick walls, should be built, where air was one of the chief requirements, he did not know, and he was glad that Mr. Hall did not agree with the practice. His own feeling as to lodging the patients was that the buildings in which they were should be open on all four sides as far as possible. He had never visited the Victoria Sanatorium at Edinburgh, but he had seen plans of it, and he believed that all patients were lodged in what might be called detached wards, which were open on at least three sides. There seemed to be an enormous advantage in that. It might be said that if several patients were put in one ward they kept each other awake; that might be so to some extent, but the poor were accustomed to be together a great deal, and they did not require the same solitude which other people liked, and they were rather "out of it" if they were left alone, and for them there was a great deal in favour of wards. If the wards were detached and open at least on two sides, if not three, one could always have one side open according to the way the wind was blowing. There was the idea that electric light was the proper illuminant for a sanatorium. Why should it be thought necessary? Why should they be so afraid of vitiating the air when the patient ought to live practically in the open air? They could not vitiate the open air by any illuminant, and therefore it did not matter what the light was if the building was properly planned. There was no doubt that cost was one of the greatest difficulties. The examples of sanatoria at Northwood and Midhurst had checked the building of sanatoria because they had cost so much money.

The Chairman, in putting the vote of thanks, said they owed a great debt of

gratitude to Mr. Hall for his extremely valuable paper. It had been very interesting to him to see what architects were doing towards combating the scourge of consumption, and it was good to hear a certain amount of criticism from another important profession, the members of which were also deeply interested in the matter. He thought that foreigners had little to teach us in the way of planning these buildings, and there were points on which we could teach them. One difficulty in dealing with the poorer class of consumptive patients was that they were taken away from poverty-stricken and more or less unhealthy surroundings, and put for a time in the midst of comparative luxury, where they were well fed and necessarily lived a somewhat indolent life, though the new tendency was to give them well-regulated exercise. When they were sufficiently cured, they were turned out of the sanatorium to make room for more necessitous cases, and he believed that the difficulty was that such cases often relapsed. It had occurred to him that provision ought to be made in these institutions, so that these cases could be retained on the land or under a certain amount of supervision for the time being, and until they were more fitted to return to their natural surroundings. Could these sanatoria be made to include some sort of farm colony where a reasonable amount of healthy work could be given to the patient? He should like to endorse Mr. Hall's views as to the cheaper class of buildings, for in a small way he had given attention to buildings of this kind. He believed that such buildings could be erected at a cost of 80*l.* to 100*l.* per bed, even without using thin partition walls, and even complying with the onerous by-laws.

The vote of thanks having been heartily agreed to,

Mr. Hall, in reply, said that when he agreed to write a paper on the subject, as he had already written on sanatoria, he thought it would be difficult to write anything new; but he put himself in communication with gentlemen here and on the Continent, and they responded well, and had helped him a good deal. He was glad they had had Dr. Bulstrode with them that evening, and Dr. Lyon, and others, because they were specially interested in the subject. With reference to Dr. Lyon's remarks as to not requiring so much accommodation for women as for men in sanatoria, he quite agreed, but there was no reason why a sanatorium should not be built so that every part was interchangeable, and at Frimley the buildings were so designed that there were eight units of eleven beds, which meant that if they wanted seven units for men and only one for women, or any other arrangement, they could have it, at the same time keeping the sexes quite separate. Dr. Lyon very much interested them by saying that all they wanted was shelter, and suggested that they should get that by four posts and a roof. He (the speaker) was glad to hear it, but he thought a vertical shelter as well was needed, and he would rather trust himself to the heavens than the winds howling across the earth. We must not exaggerate. Fresh air was wanted, but we could not live for long in a gale of wind. Why were soldiers put under tents or under shelter? Because the general atmospheric conditions were too severe. Plenty of fresh air was necessary, but so also was plenty of shelter. [Dr. Lyon: At Victoria Park the patients live in a gale of wind, and they do very well.] He agreed that living in a gale of wind was beautiful in summer—but in winter! With a storm of sleet and wind it was absurd to suppose that an invalid could endure it. A movable screen could be employed, but that all added to the cost. In the cheap sanatoria he had designed, the whole front was open. Up to the height of 6 ft. the windows could be closed while a patient was dressing, but they would be kept open and the back as well, and there was a free current of air right through. It was from the southern side that the genial air came and from the north side the ungenial air, and plenty of opening was required. The difference of temperature between the back and the front in the summer would induce a current of air, and it was thus an advantage to have shade on one side and sun on the other in order to get this current. As to the cost of shelters, he knew of one that was erected for 12s. 6d., but it was of a primitive type of the kind that our forefathers built, when they did not have the deteriorating influences of civilisation to contend against. They could not build anything in the nature of a permanent structure for 12s. 6d., and he believed that what he had designed was the last word in cheapness. He did not think it was egotism to say that he knew something of building, and he had taken the lowest figures he could get. The buildings did not comply with the by-laws, but the by-laws were not designed for them. The by-laws were not laws of the Medes and Persians; they were made by sensible men, in a sensible department, and to deal with certain things; and when the Department found that what was wanted for a sanatorium was a shelter that would enable one to provide accommodation for the poorer people, they would listen to reasonable suggesteions, and would agree that by-laws designed for one set of circumstances had nothing to do with by-laws designed for other circumstances. There was no reason why walls which were thick enough to keep out the weather, especially where the buildings were, as in this case, of one story, were not as good as walls which were 20 in. thick. The buildings he had designed were to be of permanent material and waterproof in every way, and the estimate he had formed was not a guess, because quantities had been taken out and he had had prices from a contractor. If brick walls, 14 in. thick, were insisted upon it was ridiculous to talk about cheapness. The reason for 14-in. walls was that in ordinary brickwork that was the least thickness that would enable them to be sure of keeping out moisture; but given a material which was impervious, it did not matter what the thickness was. As to one man one ward, he was in agreement, and he did not think it was desirable to put seven or eight or ten patients together. It was true that the poor liked to be aggregated, but that was not to be encouraged, because of coughing, etc., which disturbed the other patients, and doctors agreed that that was bad. But there was good reason for the two or three-bed wards sometimes, where a patient was subject to hæmorrhage, and there was no attendant near, it was necessary for something to be done at once, and another patient could either send for the nurse or attend to the patient. He did not like the great aggregation of consumptive patients, but in the big hospitals there were reasons why that was necessary. There, a lot of wards were necessary, and accommodation for nurses and doctors, but in the early stages of the disease there was no necessity for this. As to drains, in his paper he said that the drains were only for soiled water. He did not like bath water to run on the surface, because it deposited soap on the way and the channels got fouled. When the bath first discharged it was all right, but when the discharge slowed down it left the deposits. He provided earth-closets, and he suggested that the bath water should be emptied into cesspools and then sent on to the land. If they said they must have cheap sanatoria they could not have all the luxuries, and they could not have big settling and filtering tanks. He agreed as to what had been said about the electric light; it was not necessary to have it, but it had the advantage that it did not soil the walls as other light did, and that was a reason for using the light where they could get it. Candles would do, but for the danger, or oil, or gas, but they had to be paid for, and if they asked for the cheapest thing they could not have the most expensive. As to patients relapsing after leaving the life of the sanatorium, at Frimley Dr. Paterson had broken away from the theory of the indolent life. There was no such thing as idleness, and every patient was well employed, according to their ability; and there was excellent *esprit de corps* among the patients, and if there was anything like malingering, all the other patients were against the culprit, and he had to fall into line and do his work. This agreed so well with the patients that the dietary scale had to be increased, as they got so healthy and hungry and they desired to work. They went back to their sordid surroundings, it was true, but the great benefit of the sanatorium life was the hygienic treatment and lessons given. Patients were taught to like the open window and fresh air, and when they returned they still liked it, and there were other influences, too. Of course, people who returned to the bad conditions suffered to some extent, but the education generally was to the end of knowing more about the healthy life. When the Royal Sanitary Institute was first started it was difficult to get people to listen to the teaching, but now the Institute received invitations year after year to hold their congress in some city or other in order that hygiene might be taught to the people, and that showed that the public were getting interested in such matters, and so the death-rate was lowered and health was improved, and that meant that the surroundings of the people were being improved, too.

The Chairman announced that the next meeting would be held on April 12, when Mr. J. A. Marshall would read a paper on "Westminster Cathedral."

The meeting then terminated.

THE ARCHITECTURE OF ROME AND NORTHERN ITALY, FROM CONSTANTINE TO 1100 A.D.

On Tuesday, 19th inst., Mr. Alan Potter read a most interesting paper before the Architectural Association Camera and Cycling Club on "The Architecture of Rome and Northern Italy, from Constantine to 1100 A.D.," of which the following is the substance:—

In commencing, Mr. Potter expressed some diffidence at touching a period which, owing to difficulties in exactly dating the principal buildings, is open to so much controversy. After predicating the generally accepted fact that the Lombardic Romanesque was Classical rather than Byzantine in nature, he briefly explained his paper as an attempt to trace the continuity of the Roman tradition, and to show, by careful consideration of the political and architectural history of the period, how the Constantinian type remained practically unaltered for so many centuries.

With this idea he proposed to take the defeat of Maxentius by Constantine in A.D. 312 as their first historical date, for, after erecting the arch which bears his name to commemorate his triumphal entry into Rome on that occasion, the Emperor went into residence in the Palace of the Lateran, and there is little doubt that on the site of the Imperial Basilica of Justice, attached, the first great Christian basilica was consecrated in 324, one year after Constantine had presented the palace itself to Sylvester I., Bishop of Rome. The plan of this basilica was probably of the usual double-aisled type, but even this is now uncertain.

In 324 the churches of St. Peter, St. Paul, and St. Agnes were started over the catacombs, and without the walls.

The nave of St. Peter's was 285 ft. by 75 ft., with double aisles separated from each other by Corinthian colonnades 35 ft. high, bearing walls 100 ft. high, with a clearstory above the aisle roof; it had the usual western transept and apse, the latter being screened by five arches from the nave and aisles; at the east end a large atrium was connected with the city gate, near the tomb of Hadrian (now known as the Castle of St. Angelo), by a colonnade over 1,000 ft. long.

The system of orientation, it must be remembered, was owing to the importance then attached to what is now known as the "eastward position."

St. Agnes is a smaller type, having only narrow single aisles and nave, with the apse immediately out of it. It is, however, interesting, as the narthex is formed within the church by continuing the aisles round the west end, and for the galleries over the side aisles below the clearstory windows, the latter, although they overcome the difficulty of treating the immense wall space, never recurring until we come to the triforium of later times.

The Church of St. Paul was similar to St. Agnes, though smaller, and we have no data as to galleries.

The architecture of the Eastern Empire may be dated from 330, when Constantine moved the Government to Byzantium, and from that time, while Italian work continued in the many-columned, wooden-roofed type of basilica, the Eastern Empire worked out the more solid manner, with few points of support and fireproof roofs and floors, a type so well suited to the East as to be perpetuated by all the changing races and faiths which followed the Byzantines.

In the West, Constantine, before 336, built San Lorenzo of the smaller type. The early Church of Can Clemente, mentioned by S. Jerome in 392, was similar, and must have been its latest example. Constantine also built a circular tomb at Rome, 72 ft. in diameter, with an inner colonnade of coupled columns, 37 ft. in diameter, carrying a dome, 60 ft. high, constructed in the old Roman way. The circular aisles were covered by a continuous barrel-vault enriched with mosaics.

In 336 Pope and Emperor both died, the latter being followed by his sons Constantine II., Constantius, and Constans. Italy fell to Constans, who was at this time only seventeen years old, and in 340, at the death of Constantine II., he also became Emperor in the East, to be murdered in 350 by Magnentius and Vetranio, who, in their turn, were defeated by Constantius, the only surviving brother. His reign of eleven years is notable for the doctrinal controversies concerning the Arian heresy, in which the Emperor supported Bishop Arius, separating himself from orthodox Rome, and, through Bishop Ulfilas, converted the Goths to that doctrine, a fact which is important in later history.

Sylvester's successor, Julius I., was responsible for St. Maria Trastevere, a basilica with nave and single aisles crossed at the west, and by a second narrow transept not projecting beyond the aisles.

This type of plan was to reappear at Toscanella. In 352 Liberius succeeded Julius; in his pontificate of two years, Santa Maria Maggiore was built, remarkable for the proportion of the nave height and width, being each 60 ft.

In 361 Constantius, the Arian, was followed by the much-maligned Julian, the "Apostate," who in 363 gave place to Valentinian in the West and Valens in the East.

In this reign the Gothic Empire of Hermanries to the north of the Alps was broken up by the Hun invasion, with the result that Frithigern and his Visigoths, after fighting their way to Hadrianople, were there defeated by Valens, who was himself killed in the battle.

In 379 Gratian, having succeeded Valentinian, appointed Theodosius Emperor of the East. In 383 Gratian was killed at Paris by Maximus, in command of the British troops, who, in his turn, was defeated and slain by Theodosius. The latter, thus becoming sole Emperor located his capital at Milan for the time being. Whilst there, his friend S. Ambrose consecrated the Church of St. Lorenzo, of which none of the original work remains.

In 387 Pope Siricius commenced the rebuilding of St. Paul's, at Rome, on a grander scale; the body of the church being now planned to the west of the shrine instead of to the East. The new church was similar to, but slightly smaller than, the basilica of St. Peter. The church existed almost complete until the fire of 1822, and has been rebuilt in the same manner.

The year 395 marks the final division of the Empire, Arcadius and Honorius, sons of Theodosius, taking respectively the East and West. The cathedral and baptistery at Ravenna date from about this time, being founded by Bishop Ursus before his death in 396. The former, a five-aisled basilica, existed into the XVIIIth century, the latter being rebuilt by Bishop Neon before 450. In 400 came the invasion of Italy by Alaric, the Goth, who ravaged the country till Honorius's general, Stilicho, the Vandal, having relieved Milan and defeated him at Pollentia and Verona with troops drawn from Britain and Gaul, bribed him to withdraw into Illyria. After holding a triumph in Rome, Honorius withdrew to Ravenna and completed the building began by Ursus.

In 406 Radagaisus, the Northman, penetrated to Florence, near where Stilicho overtook him, and starved him into surrender. Alaric was soon back in Italy acting as mercenary to the Emperor, but Honorius having beheaded Stilicho, and 30,000 of the latter's troops having in consequence joined Alaric, the combined armies plundered town after town, and in 409 commenced the Siege of Rome. Being disgusted at the many fruitless negotiations with Honorius at Ravenna, aid after once withdrawing from before Rome, Alaric seized the corn ships at Ostia, and, so placing Rome again at his mercy, made the Senate depose Honorius and make Attalus Emperor. The latter granted Alaric's demands, only to be deposed the next year at Rimini. Further overtures to Honorius on the part of the Goths followed, and, these being rejected, on August 24, 410, they entered Rome, and for a week sacked the city.

From now onwards Rome ceases to be the seat of the Imperial Government, and the power of the Pope steadily rises.

In 412 Alaric died whilst attempting another raid, and was succeeded by Atawulf, who, having made peace with Honorius in 414, married the Emperor's sister, Galla Placidia, only to be defeated by Constantius, a Roman general, and driven into Spain, where he was murdered in 415. Placidia then returned to Ravenna, married this Constantius, and at the death of Honorius in 423, her infant son, Valentinian III., was proclaimed Emperor, in whose name she reigned for more than twenty-five years. In Ravenna she built Sant' Agata, S. Francesco, S. Giovanni Evangelista, and S. Giovanni Battista, all of which were rebuilt in the XVIIIth century, except the towers of San Giovanni Evangelista (dated 424) and San Giovanni Battista, built a few years later. In 425 she rebuilt Bishop Ursus's baptistery on an octagonal plan, with four projecting apses, the interior having two stories of arcading with the alternate arches opening into the apses, and the arches of the upper story containing a group of three smaller arches with the centre one pierced by a round-headed window. From these arches a segmental dome springs, constructed of earthenware pots laid spirally, the whole enriched internally with blue mosaics of almost contemporary date, representing the Baptism of Christ. This building has a quite simple exterior, the part above the plain windows being relieved by shallow recesses and pilaster strips.

In 440 she commenced the mausoleum in which the sarcophagi of herself, Honorius, and her husband Constantius, still rest, each in a separate recess out of the central domed space, 12 ft. square, from which on the fourth side there extends the equivalent of a nave. This building was enriched internally with marble below and blue mosaics above. In 450, the year of her death, the Archbishop's palace was built.

During the early part of her reign Pope Sixtus III. built the second church of San Lorenzo at Rome, butting into the earlier one so that the apses are back to back. He also built the church of S. Sabina of the simple basilica type, the interior of which is similar to later work in Ravenna.

The period of twenty years after 450 was a confused medley of barbarian invasions and anarchy and worthless emporors and popes. Sixteen years after the sack of Rome by Genseric, Pope Simplicius dedicated the newly-rebuilt San Stephano Rotondo, circular in plan, but retaining the Greek cross motive. In 476 Romulus Augustulus, the last Western Roman Emperor, was deposed by Odoacer, the Mercenary, who became first Gothic King of Italy. He reigned for six years, and was murdered at Ravenna, having been thrice defeated by Theodoric, the Arian Ostrogoth, who invaded Italy in the name of Zeno of Byzantium.

Theodoric's reign of thirty-six years is notable for peace and religious toleration. He founded a second cathedral at Ravenna for his heretical priesthood in the first year of his reign, now known as S. Apollinare Nuovo. It is a three-aisled basilica, the nave having a flat ceiling and terminating in a broad apse, which, though circular within, is polygonal externally on plan. This building, though it closely followed the Roman manner, had no portion taken from an older building, and is distinctly sturdier and more spacious in character. The arch moulds are heavier, and the cornice has become a mere string course; the proportion of the triforium wall and clearstory are more pleasing, and it may fairly be considered as a distinct step towards fully-developed Romanesque. On the triforium wall there is a magnificent band of mosaics, illustrating Theodoric's palace and a procession of saints and prophets on one side, with the port of Classis and a procession of Virgins on the other. In the south aisle is a charming pulpit, evidently a remnant of some original screen. The impost of the end pier of the arcade is interesting, several of the modillions being carved as bulls' heads, side by side with those of classical form. Theodoric also built a baptistery for the Arians, similar to, though smaller than, the orthodox one.

All these buildings were of rough brickwork, as were those of Placidia; but the tomb Theodoric built for himself in 420 is of masonry of a heavier type than any since the time of Constantine. It is two stories high, decagonal in plan externally, and internally a Greek cross in the lower chamber, and a circle, 30 ft. diameter, above, and roofed with one block of stone. The ground floor has a deep, blind arcade forming a terrace round the whole, covered with an arcaded gallery, which has now disappeared. It is certainly Greek work.

There is extant an interesting letter from Theodoric to the architect he appointed to have charge of the public buildings of Rome and Ravenna. After complimenting the intelligence and talents of this gentleman, he says:—

"It is my wish that you preserve in its original splendour all which is ancient, and that whatever you add to it may be conformable to it in style."

He then emphasises the importance of the work and the varied knowledge it is necessary for an architect to possess, and remarks that success will be his best reward.

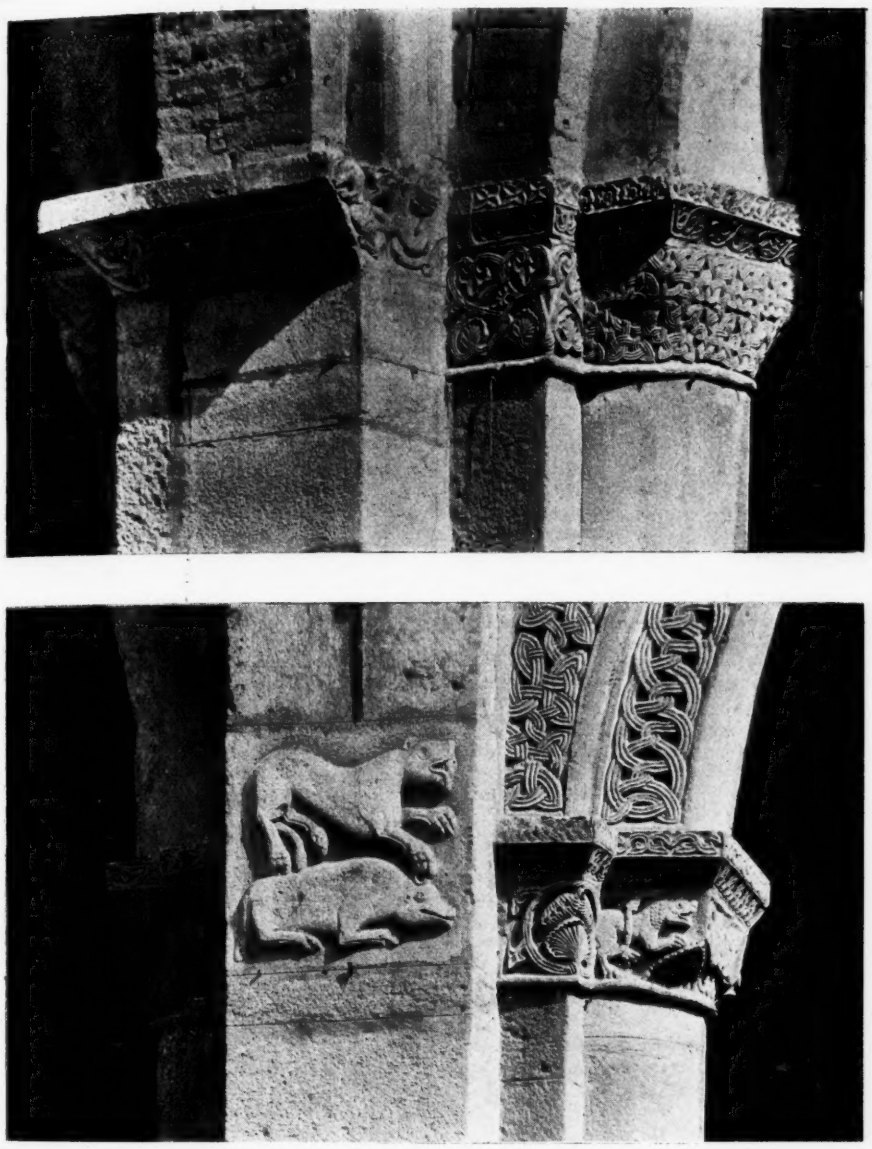
Theodoric, in the last few years of his reign, sullied his reputation by murdering his most faithful friends Boethius and Symmachus, and by abandoning his policy of religious toleration, this change being the result of the decree of the Byzantium Emperor to rededicate all the Arian churches to orthodox use. In this connexion he sent Pope John I. on a mission to Constantinople, and with him went Ecclesium, Bishop of Ravenna, who was so impressed by the magnificence of the work in progress in the east that he brought back one, Julian, a goldsmith. Hence we have San Vitale, a church Roman in plan and Byzantine in its dome and details.

It is a rectangular octagon, 110 ft. in diameter, with a central space about 50 ft. across. The small semi-circular exedræ being of Eastern origin. The decoration is pure Byzantine in the mosaics and in the details of the caps, etc. Theodoric died before the work was complete, and Queen Amalaswintha ruled in his stead, as regent for his grandson Athalaric. On the death of her son in 534 she raised her cousin Theodahad to an equal throne, and was herself secretly strangled in 534.

In Theodahad's reign Sant' Apollinare in Classe was built, remarkable for the elaboration of the shallow wall arcading. The plan and interior is similar to the Arian cathedral at Ravenna, though more advanced from classic tradition. The apse of this church is comparatively unharmed, though the decoration of the nave has vanished partly through being plundered to help rebuild the cathedral at Rimini in the XVth century.

For the next twenty years Justinian's generals, Belisarius and Narses, waged constant war with the Goths under Witigis and Totila, and during which Rome was besieged four times. Finally, in March, 553, Teia, the last Gothic king, was starved into surrender; he and his race left Italy for ever, and disappeared from Europe, being henceforward represented by the Exarch of Ravenna, vassal of the Byzantine Emperors. In 554 Narses the Exarch withstood the invasion of the Franks and Alemanni, and until his disgrace and death in 587 ruled Italy. In 568 Alboin and his Lombards swarmed over the Julian Alps and occupied the country as far as Spoleto; Pavia alone resisted, but after a three years' siege Alboin entered it and made it his capital. The inhabitants of Rome fled before approaching barbarians, carrying with them what they could, and the Archbishop of Aquileia took refuge on the Isle of Grado, where three years later he built a cathedral and baptistery. The former is exactly similar in plan to the Ravenna churches. For twenty years the little republic of Como held out under Francione, a general of Narses, and the citizens on surrendering were given the rights of freemen, and being known as skilled craftsmen developed into a privileged body of masons.

When they entered Italy the Lombards were but brutal and savage tribes, but within ten years they began building churches (in



Capitals in Atrium, S. Ambrogio, Milan.

which they probably employed the Comacini), and in 643, under Rotharis, a code of building by-laws was drawn up, including workmen's compensation not unlike our own. By the time of Luitprand (712-744) it was found necessary to make a schedule of prices for these builders, an interesting feature being that the cost of vaulting per foot super was fifteen times as great as that of walling. Of the many churches built in the 200 years of Lombard rule we have documentary evidence, but not a single actual example. About 753 Luitprand and his successor Astolfo drove the Exarch of Ravenna from Italy during a revolt caused by the iconoclastic activity of Leo, the Isaurian, and rather than see the hated Lombard triumphant the Pope came to the aid of his ancient enemy, so bringing the quarrel on himself. In self-defence Stephen IV. twice obtained help from Pepin, the Frank, and in 774 Charlemagne, son of Pepin, broke the Lombard power, and deposed Desiderius, their king. Unlige the Goths they remained in Italy, and, mixing with the older races, formed the strong, free, northern communities of later times.

Pope Hadrian I., Stephen's successor, in one of the longest reigns in Papal history, did much for Rome and its monuments. He overhauled most of the basilicas, among those he rebuilt being Sta. Maria in Cosmedin, in which he made a strange alteration in plan, so that, instead of the inner arcades being continuous, they are divided into three groups of four arches by plain oblong piers. This was probably done to give strength to the length of the walls. The tower of S. Giorgio in Velabro is supposed to be contemporary or earlier, and it is interesting to note the difference between these Roman campanili and those of the North. Here we have prominent horizontal lines and heavily-enriched cornices, whereas in San Satyro, at Milan, a perfect Northern example, we find an entirely vertical composition. The dates of this period are most confused, but authorities agree that the following churches may be dated from the middle of the IXth century.

S. Vincenzo, in Prato, at Milan, a three-aisle basilica, with three eastern apses, decorated externally by a simple arched gallery.

S. Pietro, in Grado, near Pisa, of the same type, with a single western apse, which still remains, the eastern apses being constructed about 890.

Both of these have the arched corbel table suggested in the baptistery of Galla Placidia at Ravenna; but in S. Pietro the pilaster strips are narrower and of greater projection. A rather more refined rendering of this treatment exists in the little circular church of S. Tommaso, in Limine, near Bergamo, of the same century, where the strips are attenuated half columns with almost classic bases and small cushion caps. This church has a good example of a tower opening with mid-wall shaft carrying an oblong stilt block, similar to those of S. Vitale 300 years before and in England 100 years later. According to Cattaneo, the apses of S. Ambrogio, Milan, as they exist to-day, were built between 824 and 859, and the rest of the church was rebuilt in the latter half of the century, a three-aisle basilica with simple arcades separating the aisles, and having a complete arcaded atrium at the west end.

The Xth century was perhaps the darkest known in Italy; ruled by absentee emperors, the worthless descendants of Charlemagne: Popes set up for a day, and the continual menace of the Franks in the north and in the south the Saracens, who in 846 had plundered the churches of S. Peter and S. Paul. At one period there were no less than three Popes in Romes—one at the Lateran, one at the Vatican, and one at S. Mary's across the Tiber.

In 900 Otho, King of the Eastern Franks, entered Italy, and received the iron crown at Pavia. In 902 he was crowned at S. Peter's, and for thirteen years he ruled as the first and one of the greater of the German Kaisers. This was but an interlude. In 996 Otho II., a youth of sixteen, marched into Italy, bent on reform. At the death of John XV. he raised his cousin Bruno to the papal chair, and was crowned himself at S. Peter's. The Romans replied with an anti-Pope, John XVI., and in three years rid themselves of both Pope and Emperor.

In architecture there is a gap of 130 years to 1008, when we find the cathedral on the site of Torcello, near Venice, being rebuilt on the old basilica plan. In the apse of this church we have the most perfect existing bishop's throne flanked by the seats of the presbyters. The caps, free copies of the Corinthian, are the work of Byzantine artists engaged at the time on S. Mark's, and the Campanile is a fine example of the vertical Northern Lombard work.

The Papal power fell to its lowest with Benedict IX., who, elected Pope at ten years of age, behaved as a brigand rather than a priest, being unoppressed, while Gregory, his brother, was "Consul Romanorum." In 1044 John Gratian, afterwards Gregory VI., bought the Papacy from him, and this proved the turn of the tide. The Emperors Henry II. and Henry III., backed by the monks and people, did their utmost to reform the Church, and Hildebrand, the monk of Cluny, being elected Pope, as Gregory VII., not only succeeded in this, but made the Emperor, Henry IV., who had sided against him, come as a penitent to surrender his crown.

This was the commencement of a great period of activity; in 1013 the rebuilding of S. Miniato at Florence was commenced, and a great stride was made in dividing that otherwise ordinary basilican church into three equal compartments by arches thrown across the nave. The walls are decorated with marble in the Byzantine manner, but the wall arcades of the apse are a new development, which, though foreshadowed at Ravenna in the VIth century, was only worked out at Pisa later. Forty years later Dominico Contarini, Doge of Venice, began to rebuild the old IXth century wooden church of St. Mark's with a lasting material. This apparently pure Byzantine building when dissected shows itself to be a descendant of Constantine's basilica, and if we strip the plan of its transepts and the vestibules to the nave, and study it in bulk, there remain the eight massive piers, between each of which there is a wide barrel-vaulted recess, similar to the afore-mentioned basilica and to the earlier tepidarium of the Baths of Caracalla. The fire-proof roof in three compartments only emphasises this origin. The plan of S. Irene at Constantinople illustrates the intermediate stage, the main piers being nearer the size of the Roman example. In the Roman example the vault was apparently carried by an overgrown Corinthian column; in S. Mark's the piers obviously do the work—in fact, the great charm of church is its essential truth and completeness.

To the later half of this century two well-known buildings also belong, the existing S. Ambrogio of Milan and Pisa Cathedral, the former being rebuilt from a former basilican church, and the piers being respaced alternately large and small. The galleries over the aisles are reminiscent of the Constantinian galleried churches of Rome.

At Toscanella the churches of S. Mary and S. Peter were both rebuilt at this time, the plans being of the early type of basilica with an eastern transept, with the difference that in these later ones the transept is divided from the nave and aisles by a cross-wall pierced with a single wide-spanned arch. A similar treatment occurs in S. Paolo a ripa d'Arno at Pisa, a contemporary building, in which the transepts boldly project beyond the aisles, though still unaisled themselves, and the crossing is covered with a dome on pendentives. Here, too, the main arcades are pointed. The external walls also are enriched with wall arcades similar to, but more developed than, those at Classis;

also the façade, which is of different date and design.

The cathedral at Pisa has a fine though too regular example of this enrichment. The plan is a fully-developed cruciform church, but with nave and aisle arcades carried across the transepts by wider arches. There is also a triforium with grouped arches. Round openings are used throughout, and the dome is carried on squinches as at S. Ambrogio, giving cause to believe S. Paolo of later date. The cathedral at Lucca is also contemporary, and, though rebuilt in Gothic, has a similar external treatment.

In 1084 Guiscard, King of Sicily, having sacked Rome with his Normans and Saracens, released Gregory VII., who had been held prisoner by the Emperor Henry IV., who had fled. Owing to some quarrel with the citizens the Normans burnt the whole of the inhabited city, the region of the hills, which was never rebuilt. The church of S. Giovanni Paolo was burnt, and the present Lombardic apse dates from the subsequent rebuilding.

S. Michele at Pavia deserves mention, as the plan continues an arrangement of nave identical to S. Ambrogio at Milan, with the transept of Pisa spanned by single arches in line with the main arcades, which here spring from the cap level of the cap of the vaulting-shafts, and not from the arcade level, and form really the outer edges of the deep barrel vaults over the transepts, similar to the recesses of S. Mark's. The façade is typical, though early, Lombardic Romanesque, the internal dimension being expressed by strongly-marked vertical lines. The enriched bands across the front are a striking piece of individuality.

In conclusion, the speaker noted the apses of S. Teodoro, S. Pietro, and S. Michele, in Pavia, as clearly illustrating the gradual development of external ornamentation from the VIIIth century basilica to the fully-developed Lombard churches—in the first case the wall face being merely divided up with pilaster strips connected at the top by an arched corbel table; in the second, the strips are wider and the corbel table is combined with an open arcaded gallery; and in S. Michele the corbel table has vanished, and apse is divided into three with compound piers and subdivided by slender shafts.

Mr. H. P. G. Maule proposed a vote of thanks, which was seconded by Mr. T. Frank Green and supported by several other gentlemen. In the course of a brief discussion the question of how far the plan of S. Mark was in direct descent from the basilica of Constantine was raised, authorities being quoted who derived it rather from the church of the Holy Apostles. The derivation of the basilica church plan was also queried, and an interesting point was raised as to whether the English round churches could be traced to those mentioned in the paper.

[We publish as one of our plates this week reproductions of some of Mr. Potter's photographs from buildings referred to in his paper.]

THE ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.

THE eleventh meeting of this section was held at 18, Tufton-street, Westminster, S.W., on March 20, Mr. Frank Lishman being in the chair, when a paper was read by Mr. W. L. Trant Brown on "Fences and Gates," illustrated by drawings kindly lent by Mr. Voysey. A fence, he considered, indicated a shutting off or shutting out, a defence from enemies, and so it came to be employed to define a boundary. In times past watercourses were used for this purpose, and also moats, but now the custom had lapsed, and with it their picturesqueness. Next to the stream came the hedgerow, which seemed to fit in so well with its surroundings, and this, the reader thought, might be used more than it was, even in urban districts. It had been too readily assumed, even in the country, that a constructed fence was a necessity; yet, in our quieter residential roads, the present-day fence could not claim to be for protection. In recent years there had certainly been a tendency to renounce the heavy walls with piers, such as grace the forecourts of St. John's Wood and Camden Town, and substitute something lighter and lower, and why not go a step farther and do away with railings and palisades altogether? The edge of the paving formed sufficient boundary; and if it did not, a stone or brick on edge curb would preserve the owner's rights, while a neat hedge would help to make the long lines of red brick villas more bearable. A post-and-chain fence could also be considered in this connexion, and this could be made effective. In some situations, the reader thought, a double hedge might be tried, the inner one being from 2 ft. to 4 ft. higher than the outer one, and both cut squarely on the top. Small mop-head trees could also be used with advantage, either in the hedge or a few feet behind it. If the flank wall of your house is "dead," you might erect a high trellis with arched openings in it, and gateways, which would help to give distance and perspective effect. If iron railings were used in conjunction with a hedge, the gates should also be iron. Ordinary field gates in a well-kept estate the reader considered always looked satisfactory, more so than the carriage gates which the squire generally wished grained oak and stop-chamfered, etc., and in fact crowded with ornaments. The closer the five-barred gate was kept to the better, and a wicket gate in close conjunction with the carriage gates was to be avoided. If more emphasis was necessary, he thought setting it back in a semicircular recess was the best way. As to paint, the alternations to white were green, vandyke-brown, and (occasionally) black. Wicket and hand gates were then described, and these, he thought, should be treated as dwarf doors. Roofed-in gateways he would like to see not restricted to churchyards, but extended to entrances to houses and with seats in them. Covered paths also formed a delightful approach, especially when they were formed with solid posts or panels of treillage. A simple hand gate could be well treated as a section of the fence in which it occurred, whether it were of wood or of iron, but if the fence was brick he deprecated the use of iron for the gate. Generally, the treatment of the fence should be guided by the building it screened; some required to be low and others high, such as could form a cloister or quad. There was also the fence on a quick gradient. The desire in the reader's mind was to see the country fence (*i.e.*, the hedge) brought into town; or, if there must be a fence, one material should be adhered to, and not a combination of both. In conclusion, he thought there was room for a treatise on the history and development of fences and gates.

Mr. Gammell, in opening the debate, pointed out the disadvantages of hedges as boundaries, instancing their slow growth and liability to damage, and the constantly recurring need of trimming. Turning to the wicket-gate question, he thought it quite possible to combine the wicket and carriage gates with success.

Mr. Theakston preferred the use of hard woods, such as oak or jarrah, for gate construction, as these required no painting. Another speaker suggested that the use of white paint to gates afforded a too ready sketching ground for the village children. Mr. Attlee mentioned certain forms of fencing in local use, such as the mud wall, straw-thatched, used in the West of England; and a Hampshire variety of the turf-bank type, with a dwarf wooden fence on the top.

A discussion followed the reading of the paper, which was summed-up by Mr. C. E. Mallows, who laid stress on the point that fences and gates should be designed with the general scheme of the house by the architect, and this should be pressed home upon the client. In fences there were none that could take the place of the old holly or hawthorn hedge, and these were far better, more effective, and cheaper than the new abominations. The use of water as a boundary, and of the moat, was also most picturesque; in former years its advantage was strong as a defence from the tax-gatherer. A low stone wall with a hedge planted on top gave a fine effect, and if the house should be a seaside one the wall could be finished with tamarisk, as was done in Cornwall, and the stones set dry. Then the interstices filled with the kind of flowering plants natural to the district, and nature would do the rest. For kitchen garden walls he thought old gardens should be studied in conjunction with a good head gardener, who would give practical hints. Field gates he admired, and for wooden fences suggested the study of Japanese designs. Wicket gates, he thought, might be used with carriage gates with care, making them one-third and the carriage gates two-thirds the total width to be dealt with. Roofed-in gateways, he agreed, could be made effective, and also covered ways. Iron gates in conjunction with brick fences had been done successfully by XVIIth and XVIIIth century English builders, though not by the average present speculator. The question of treillage was worthy of a paper by itself, and he reminded those present of the paper by Mr. John Belcher in 1895. In conclusion, he hoped Mr. Brown would amplify and develop his paper into the book he spoke of.

THE CARPENTERS' HALL LECTURES: COPPICE WITH STANDARDS AND LARCH WOODS.

THE sixth and last of the series of lectures on matters connected with building was given at Carpenters' Hall on Thursday last week by Professor W. R. Fisher, B.A., the subject being "Coppice with Standards and Larch Woods." The Right Hon. Earl Fortescue was in the chair, and there were also present Viscount Dillon, F.S.A., Sir Thomas Elliott, K.C.B., of the Board of Agriculture, and the Hon. W. F. J. Dundas, agent to the Duke of Richmond.

Professor Fisher said that although forestry was greatly neglected in England the photographs that he had to show would prove that no country in the world could vie with ours in the production of magnificent larch. The chief form of woodlands in the South of England was coppice with standards and larch. The standards and larch were valuable, and the coppice supplied firewood, an important factor in districts remote from coal-pits. He knew of some Continental villages whose rates were paid by the profits on their woodlands. There was no doubt that forests were best under State management, but there were many examples of excellently-managed private forests. We had in England one great advantage over Continental countries in the law of entail, which kept the land together; minute subdivision of woodlands was not beneficial to them. There was a glaring instance of mismanagement in Ireland, where, in spite of a good soil and the finest climate for the production of woodland, there was an exceedingly low percentage. A large firm of timber merchants in Liverpool had for many years past bought about 30,000 cubic feet of beech from Ireland annually, and last year they found the supply was exhausted, and they consequently had to buy from the ports of northern France. This raised two points: Had the Irish forests been planted for successive growth, the demand could have been met; and had the freights not been so high the firm could have obtained their supply from the south of England. If noblemen living on their estates realised the advance in price that must take place they would systematically grow timber. Instead of lamenting that we had not a larger area for the cultivation of forests, we should make the best use of what we had. Some owners were already doing what they could, and the State was commencing to take an interest in the subject. [At this stage of the lecture some slides were shown of trees in France and of some oaks in the New Forest about 200 years old, which, the lecturer remarked, were worth about 50*l.* as they stood.] Larch trees sold at 1s. 3d. per cubic foot, mostly for barge building. It was necessary to always have standards of different ages, so as to cut the old ones and fill up with saplings. Copse was the best system of forestry for private owners where the soil was good enough to grow it, and where the soil was sandy pine should be grown. At Ockshott some land belonging to the Crown yielded from this system a revenue equal to 15s. per acre for land quite unfit for agriculture. Little could be obtained for the underwood, but that could be improved by keeping down rabbits and planting more valuable trees. He advised growing underwood to cover the ground and produce long boles in standards and rely on that for revenue. It was not sufficient to trust to the natural regeneration of the land for seed; planting must be done. There was no reason why only oak should be grown; black American walnut could be tried—the English variety was too branchy—

and poplar could be grown where there was a demand for it. When saplings were planted the underwood must be cleared away every five years, or the saplings would be choked, ad where rabbits existed a wire guard costing one penny should be put round each sapling. The rate of growth of oak in this country was greater than in Germany, and larch grew very rapidly in copse. Landowners should see larch grown in its native country and in places where it had been scientifically grown for a century or more. He would advise trying Japanese larch, but to place most trust in European larch. It should be sown early in April, and put in nursery at one year, and planted out at three years on a northern slope sheltered from the sun and in porous soil. Local conditions should, however, always be studied, and when the larch plants had closed up at ten or twelve years thinning must be done every five years.

A hearty vote of thanks was accorded the lecturer and the chairman at the conclusion of the lecture.

Fifty Years Ago.

FROM THE *Builder* OF MARCH 28, 1857.

IMPROVEMENTS IN THE PARKS.

IN Hyde Park extensive alterations are in progress, which may be decidedly pronounced great improvements. Rotten-row has been considerably widened, re-railed, and partially drained, so that it now forms an excellent promenade for the equestrian part of the *beau-monde*. The Ladies'-mile on the side of the Serpentine seems to have been left untouched and forgotten, except near the magazine by the bridge, where the approach to Kensington Gardens has been opened up and considerably improved.

The Ladies'-mile requires widening—not only the carriage-drive, but the paths on each side, for on fine attractive Sundays they are overcrowded, while on the north side, now apparently the fashionable lounge in the season, there are scarcely any walks at all, except ragged and irregular paths paddled out by the people themselves. The immediate vicinity of the Humane Society's Receiving-house requires improving, as at present it forms anything but a pleasing feature in the scene.

However, the grand improvement in Hyde Park is the new walk leading from the Marble Arch to Kensington Gardens. This is a decided improvement, and will be much appreciated by the denizens of the neighbourhood. It forms a pleasant walk from town to the gardens; and when the young trees and shrubs are full grown will screen the park side from the dust and *désagrémens* of the public road running parallel with it. Anyone remembering what this walk used to be—little better than a swampy puddle, replete with every kind of nuisance, offensive to more senses than one—will be highly gratified at the pleasant change effected.

Near the Marble Arch a kind of artificial mound has been formed, with a sunk road, which is for the purpose of concealing a series of conveniences, much required in the parks. These will be entirely concealed from view by the little shrubbery planted on the newly-created mound. There will be a small ornamental cottage for the residence of the Janitor of the place, which will be snugly ensconced in a bowery plantation of shrubs and trees.

In a few months, when all these alterations are effected, the young trees and shrubs in full leaf, glowing in all the beauties of the pleasant spring time, these changes and improvements will be duly appreciated: let us hope that they will be thankfully acknowledged, and due praise given where the praise is due—to the taste and exertions of the worthy Commissioner, Sir Benjamin Hall.

*** Sir Benjamin Hall's name is nearly forgotten by the present generation; but from many indications in our issues of half a century back it appears that he was in his day an exceedingly capable and energetic Commissioner of Works, and one who seems to have possessed no little personal power of imposing his opinion on the Government and the public. Such a man should be had in remembrance.—ED.

Illustrations.

THE HALL, CHARTERHOUSE.

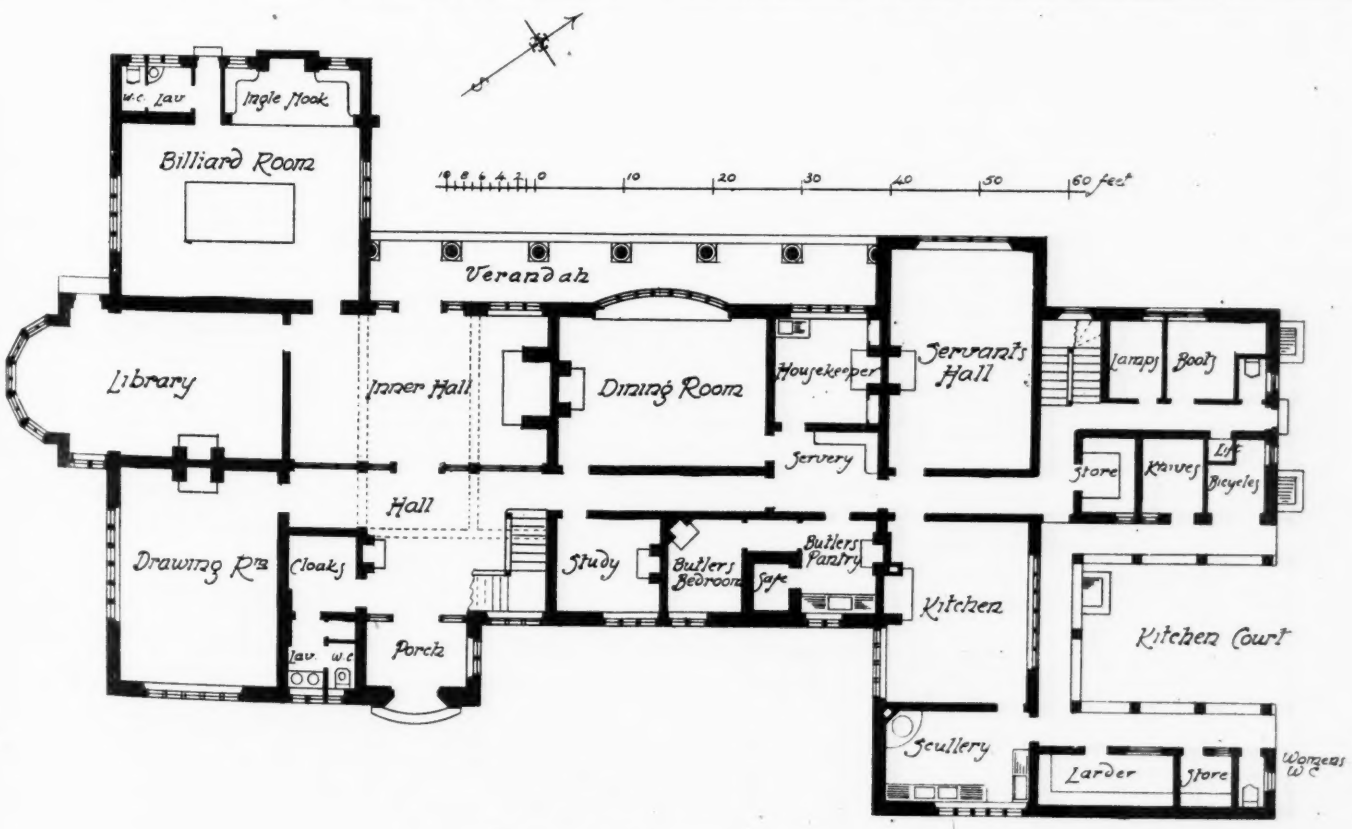
THIS drawing, by Mr. A. E. Brooker, gained for its author the silver medal of the Royal Academy for perspective drawing. It is a very clearly-drawn piece of perspective of a rather difficult subject.

A few words on the history of the Hall may be of interest. By deeds, dated May 31 and June 7, 1565, Roger, second Lord North, sold for 2,820*l.* to Thomas, fourth Duke of Norfolk, the Carthusian convent of the Salutation, founded by Sir Walter de Manny, K.G., with a bequest to that intent of Michael de Northburgh, Bishop of London in 1354-71. During his occupancy of Howard House, which terminated with his attainder and conviction in 1572, the Duke greatly altered the character of the late Gothic conventual guest hall. He inserted the screen, with musicians' gallery above, along the west side—since shorn by either his son Thomas, or Sutton, of its length at the north end, by the addition of the richly-carved side-gallery, which carries standards for lights. The Duke, it appears (though some say Sutton), raised the walls for a quasi-clearstory and the hammer-beam roof which has finely-carved pendants hanging from the beam-ends. He also fitted up the greater portion of the carved oak work, with the panelling around the walls; his initials and date, "T.N. 1571," are repeated in the carving. Thomas Sutton acquired Howard House in May, 1611, from Thomas, Earl of Suffolk (second son of Duke Thomas), in whose time, it seems, was built the grand staircase, from which there is access, along the side-gallery in the Hall, to the western apartments. The stone chimneypiece bears the device, at each end, of a cannon with powder barrel and ball, in allusion to Sutton's office as Master-General of the Ordnance in the North, with his coat-arms. The "Old Codds' Hall," measuring 49 ft. by 28 ft., and 55 ft. high, abuts against the Master's, or Prior's, Lodgings on the east side, and on the north side against the Fratry and the Presence Chamber, or (old) Governors' Room, above. Sutton, it may be observed, died at Hackney on December 12, 1611 ("Founder's Day"), not many months after he bought, for 13,000*l.*, his "Hospital of King James."

In our issue of March 31, last year, we published Mr. A. S. Carter's measured drawings of the oaken screen and side-gallery, with a plan and details.

PROPOSED HOUSE IN GLOUCESTERSHIRE.

THIS house was to be built on a site at the foot of Rodborough Hill, much of which would be made-up ground and terraced gardens. The materials were local stone for dressings, mullions, etc., set in red bricks, and roofed with Broseley tiles. All the

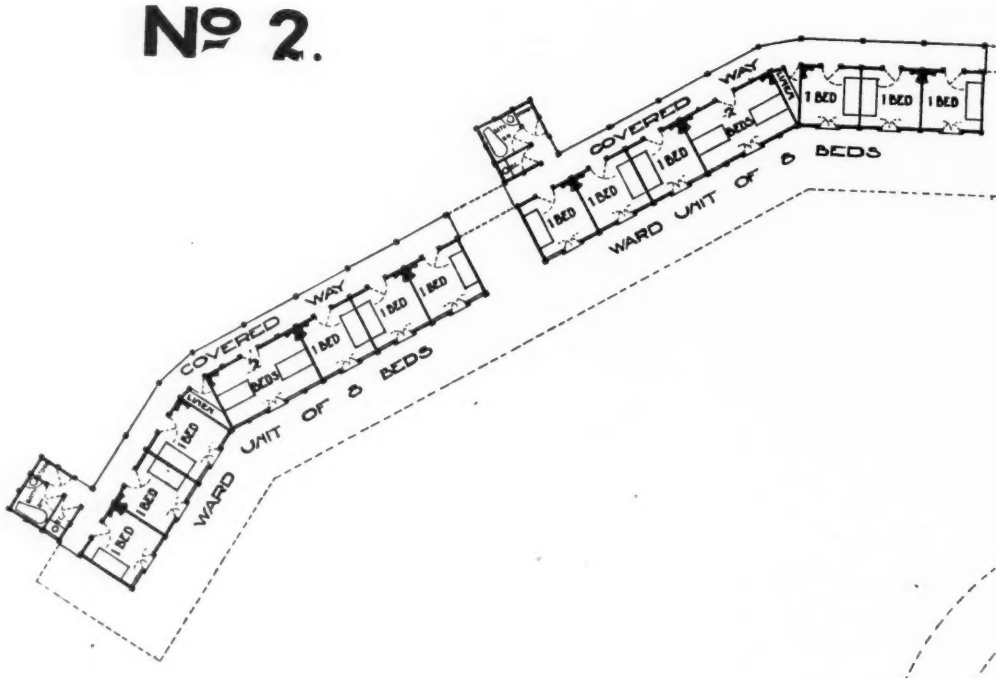


— Ground Floor Plan —

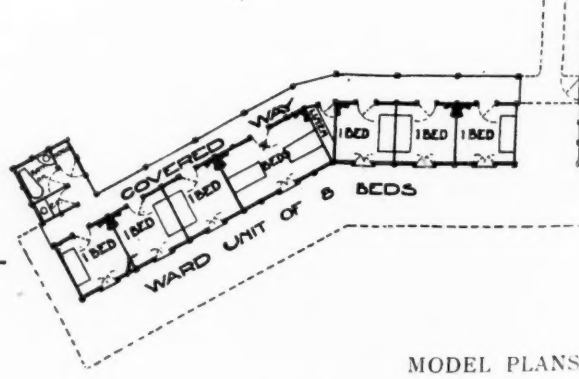
Proposed House in Gloucestershire.

SANATORIA Nos 1 & 2
FOR 16 & 32 BEDS RESPECTIVELY.

No 2.



No 1.



ANATORIA BY MR. E. T. HALL, F.R.I.B.A. (*see page* 389).

interior woodwork in oak, fumed and wax-polished, with exception of the kitchen wing. This design was abandoned in favour of one of smaller dimensions, chiefly owing to the cost of making up the ground on a very sloping site.

Mr. A. E. Bullock is the architect.

PROPOSED HOUSE AT PARKTOWN, JOHANNESBURG.

THIS house has been designed for a site on a sloping piece of ground in this suburb of Johannesburg. The materials for the walls are local bricks—rough-cast externally, and the copings of hard Keene's cement (stone being too expensive). The roof to be covered with a form of pantile which is now being made locally. The whole interior to be finished in quite a simple way with deal woodwork, stained and waxed. The estimated cost of the house is about 7,000*l*.

The architect is Mr. R. Weir Schultz.

BANQUETING HALL FOR THE PARK HOTEL, CARDIFF.

THIS room has recently been executed by the Bath Cabinet-makers Company, Ltd., from designs and details by Mr. H. Davis Richter. The object has been to keep the treatment broadly simple with refined detail and some richly-cut carving in the style of Grinling Gibbons.

The drawing was exhibited at last year's Royal Academy.

ILLUSTRATIONS TO "ARCHITECTURE OF ROME AND NORTH ITALY."

THESE illustrations, which are from photographs taken by Mr. Alan Potter, a member of the Architectural Association Camera and Cycling Club, are given to accompany the Report of his paper on the subject, read before the above-named Club on the 19th inst., and reported on another page.

Nos. 1 and 2 are in the atrium of S. Ambrogio, Milan.

3. Interior of St. Mark's, Venice, looking across the nave.
4. In the choir of S. Vitale, Ravenna.
5. Part of triforium, S. Vitale.
6. North doorway, St. Mark's, Venice.
7. SS. Giovanni e Paolo, Rome.
8. Detail of north doorway, St. Mark's.

Builders' and Contractors' Column.

THE INSTITUTE OF BUILDERS.

THE Institute of Builders' twenty-third annual general meeting was held at the Institute Offices, 31 and 32, Bedford-street, Strand, W.C., on March 21.

The annual report and audited accounts and balance-sheets of general account and benevolent fund were received and adopted.

The Report stated that since the accession to power of the present Government, various Bills affecting the building and other industries had been introduced in the House of Commons, many of which were of so drastic and partial a character that the Council could not do otherwise than offer the strongest possible opposition to their being placed on the statutes. Though it was outside the functions of that Institute to interfere between employers and workmen in their mutual relations, the Council felt that it would not be doing its duty were it to allow such Bills as those relating to Workmen's Compensation, Census of Production, and Prevention of Corruption to pass without expressing its opinion upon them strongly yet reasonably.

The Council does not complain of the fact that the Workmen's Compensation Act has been largely extended in its scope, and that the spirit of the Act has been more materialised. By its application to clerical staffs, dependents of all kinds, and domestic servants, the meaning of State interference is brought home to the mind of the general public, and conveys some substantial idea of what the building and allied trades have had to contend with since the passing of the Employers' Liability Act in 1880. On account of the trouble and expense it will entail on employers, and the questionable utility of the data when obtained, the Council looked with some mistrust upon the good to be derived by the State or by individuals from the operation of the Census of Production Act. A committee had been appointed by the Board of Trade to carry out this Act, and the Council, at the invitation of the President of the Board of Trade, had nominated Mr. H. H. Bartlett to act as its representative on that committee. The attention of members was drawn to the Prevention of Corruption Act of last session, which is of very wide application. The committee appointed by the Council to report upon the question of better office accommodation had co-operated with a committee appointed by the London Master Builders' Association, and considered many sites and premises, but, up to the present time, had not made any definite recommendation.

Several representations had been made urging an amendment of the agreed form of conditions of contract, but the Council hesitated to tamper with a document which, if not perfect, was the outcome of numerous and costly negotiations extending over many years. Not infrequently those who complained of its terms had not taken full advantage of the protection and powers provided.

The following elections were made:—President, Mr. Joseph Bell, J.P. (Cambridge); Junior Vice-President, Mr. Geo. Kett, J.P. (Cambridge); Treasurer, Mr. F. J. Dove (London); Hon. Auditors, Mr. F. M. May (London), and Mr. E. J. Strange (Tunbridge Wells).

To fill "rota" vacancies on the Executive Council:—Mr. T. Gregory (London), Mr. H. Arthur Bartlett (London), Mr. Basil P. Ellis (London), Mr. Alderman W. H. Jessop, J.P. (Huddersfield).

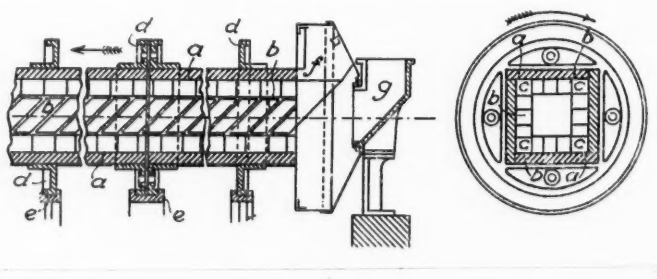
A vote of condolence was passed to the family of the late Mr. W. Sapcote, who for many years was an active member of the Executive Council.

A vote of thanks was given to Mr. F. L. Dove for his valuable services as President during the past year.

A NEW TYPE OF CONVEYOR FOR MATERIALS.

In view of the greatly extended use of concrete in building construction, and the necessity imposed on contractors by modern conditions of installing plant for handling materials in the most expeditious and economical manner, the new form of conveyor described in the *Annalen für Gewerbe* should be of interest to readers of this column. The apparatus is designed specially for the rapid transport, to considerable distances and with a small consumption of motive power, of loose materials in the form of powder—such as Portland cement, or in the form of particles or small lumps—such as sand, gravel, broken stone, and lime.

In the accompanying figure *a* is a trunk of square cross-section, constructed of steel plate or timber, to each side of which are fitted parallel blades *b* inclined at an angle of about 45 deg. to the axis of the trunk. These blades are of such length as to fill up about half the area of the interior space, but leaving at the four corners the openings *c*, which form continuous passages.



Along the exterior of the trunk, rings *d* are disposed at suitable distances apart, some forming sockets for the joints of the trunk, and each of them resting upon a pair of rollers *e*. At some point in the length of the conveyor, generally at the middle, a pulley is provided over which passes a belt transmitting power from an electric or other motor, and imparting rotary movement to the trunk.

The feed end of the apparatus is fitted with a drum *f* divided by diagonal partitions into four compartments, each receiving materials from the lower end of the hopper *g*. Similar drums and hoppers can be placed at any desired points in the length of the conveyor, and delivery shoots can be provided at intermediate points as well as at the end.

The operation of the apparatus may be thus briefly described:—

The material to be transported is delivered from the hopper *g* into the drum *f*, and thence into the trunk *a*, where, owing to the continuous rotary movement, the material slides successively upon the four series of blades *b*, falling after leaving each blade into one of the four small passages *c*, where the momentum acquired carries the particles forward to the next set of inclined blades. The same process is repeated until the material reaches the end of the conveyor or any intermediate delivery shoot that has been opened.

As the blades do not form a continuous surface and are inclined at a greater angle than that practicable in the case of a screw conveyor, and friction between them and the particles is reduced to a minimum, the quantity of material conveyed in a given time is relatively high, and the amount of motive power required is relatively low.

Practical tests have shown that the horizontal distance traversed by materials in a screw conveyor of equivalent dimensions is one-fifth of that over which similar materials can be transported in the new form of conveyor, the number of revolutions per minute being the same for each apparatus, or, in other words, one turn of the rectangular trunk produces an effect equal to that given by five turns of a screw.

Under normal working conditions the following results are said to have been obtained:—

A conveyor with the net cross-sectional area of 7 in. square, rotating at fifty revolutions per minutes, delivered per hour 7 tons of Portland cement, weighing 75 lb. per cubic foot, and another conveyor with the net cross-sectional area of $11\frac{3}{4}$ in. square, rotating at forty revolutions per minute, delivered per hour 26 tons of slag cement, weighing 60 lb. per cubic foot. The consumption of energy is stated to have been $1\frac{1}{2}$ h.p. and 3 h.p. respectively for the transport of these materials for a distance of nearly 250 ft..

A NEW AUTOMATIC FIRE PROTECTION AND WATER SUPPLY SYSTEM.

A demonstration of the working of a new system for fire protection and water supply was given on Thursday last week at the new premises of Messrs. W. H. Smith & Son in Kingsway. The system has been installed by Messrs. Merryweather & Sons to meet the difficulty, from the great height of the building, of obtaining efficient fire protection. There are eight floors above the street level, and the Water Board, not being bound to give a constant supply to such heights, would not in this case guarantee a supply above the fifth floor. The installation consists of a "Hatfield" high-pressure pump arranged to draw from a tank in the basement supplied by the street mains, and having delivery pipes connected to the fire and domestic services. The fire main is carried to the top of the building, with hydrants on each floor, and is connected to a tank of the capacity of about 500 gallons in the roof. The main enters this tank at the bottom, and is fitted with a reflux valve so that while the tank can supply the fire main, the fire main cannot deliver into the tank and cause it to overflow. A smaller pipe from the fire main is, however, carried to the top of the tank, and to this pipe a relief valve and a ball valve

are attached, and thus the fire main is used to supply the tank. Above this large tank is fitted a smaller one, and a branch from the fire main is carried over the top with a relief valve and a ball valve, and in the smaller tank is also fitted a float connected to an electric switch. On any hydrant being opened, water is first taken from the small tank, the float falls and moves the switch over, and sets the pump in the basement in motion to maintain the supply. The relief valves of both tanks are set to discharge at pressures higher than that required for throwing jets over the roof, and thus water is not delivered to either tank, but as soon as the hydrants are closed the relief valves open, and as much water as is required to fill the tanks to the proper level flows in through the ball valves. As soon as the small tank is filled the float rises, switches off the current, and stops the pump automatically.

The high service for domestic purposes is also part of the system, and a separate tank in the roof is supplied in a similar manner to the fire tank, and the control of the pump is on the same principle. To prevent the pump continually running, the float is arranged to move the switch when the water in the domestic tank has fallen to within 12 in. of the bottom. As the pump is somewhat noisy in action, this is a convenient arrangement, for the quantity of water required (about 300 gallons) to fill the tanks to the proper level would be pumped up in three minutes, and the pump would then be out of action until that quantity had been consumed. On the fifth floor is another domestic service tank supplied from the street mains, and, should the regular supply fail, a connexion with the top domestic tank allows the lower one to be filled from it.

The demonstration was entirely successful; the pump commenced to work immediately a hydrant was opened, and ceased when the small top tank filled after the hydrant was closed. A powerful jet of water was thrown over the roof, which is 100 ft. above the street level, from a ¾-in. nozzle, and it was pointed out that satisfactory jets would be obtained with two hydrants open if ½-in. nozzles were used.

THE BUILDING TRADES EXHIBITION.

WE shall be devoting a special supplement to the Building Trades Exhibition in our issue of April 13; and we may add that we shall be glad to give illustrations of exhibits, if blocks suitable for use are supplied by exhibitors.

THE ARCHITECTURAL ASSOCIATION SPRING VISITS:

VI.—NEW BUSINESS PREMISES, WIGMORE-STREET, W.

THE new premises of Messrs. Debenham & Freebody, in Wigmore-street, was the scene of the sixth visit of the session on Saturday, 23rd inst., when a good attendance of members of the Association was attracted to this important work. Mr. W. Wallace and Mr. J. S. Gibson have collaborated as architects for the fine new buildings, which consist of a general rebuilding of the premises of this well-known firm upon practically a West-end island site. The accommodation is that usual to the particular business with shops in the basement, ground and first floors workrooms, etc., on the second, fourth, and fifth stories, while a large restaurant, a lounge, fitting and hairdressing rooms are arranged on the third floor. The foregoing comprises the retail work of the concern, and is chiefly on the Wigmore-street front; the wholesale departments are at the rear of the site, effectually disconnected by a thick wall. Lifts are conveniently placed for passengers and goods, and an ingenoius arrangemet for the silent conveyance of parcels from the various departments to the dispatch-room is installed.

The principal entrance is central on the Wigmore-street side, and provides access to the main stairs, the lifts, and to the shops right and left. An angle entrance is introduced next Wimpole-street.

The planning is broad, simple, and direct; and, from the manner of the lighting and the disposition of the masses and voids, it may be inferred that the architects were not subjected to the prevalent shopkeeper's demand for extreme areas in glass. The result, therefore, is a welcome example to kindred enterprises now afoot in the neighbourhood, for we have an important dignified conception in which the claims of architecture are well combined with the demands of commerce. The superstructure rises from a heavily-arcaded base containing the two stories immediately above the street level. The fenestration treatment of these arches is especially excellent, and will, we hope, provide the lesson of simple window dressing which the British shopman can learn from his Parisian brethren. A tower enhances the importance of the main entrance; other large projecting parts have segmental pediments with marble columns. The simple mass of the angle entrance is most effective.

The popular tendency in promoters of current buildings is towards the use of glazed materials for external work for which there is ample reason. But, with all new substances the application of old forms of construction is made. The glazed terra-cotta of the façades in the buildings under notice is a mere casing to other materials of a constructional nature; yet this design would be true to the canons of art if Portland stone had been employed in the design now seen. This is, perhaps, the one weak point in what is in other respects a great work. The detail is excellent, and the jointing of the glazed work very interesting.

The marble work of the entrance halls and staircase is charming in its arrangement and choice of colour. The mahogany woodwork is thoughtful, and the whole is designed with a spirited influence of English Renaissance work, consistent in detail and in scale. The visit was much appreciated by all present.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday in the County Hall, Spring-gardens, S.W., Mr. H. P. Harris, Chairman, presiding.

Loan.—On the recommendation of the Finance Committee, it was agreed to sanction the borrowing by Hampstead Borough Council of 10,390*l.* for electric lighting purposes.

School Accommodation, Poplar.—The Education Committee recommended, and it was agreed, that the necessary steps prescribed by sect. 8 of the Education Act, 1902, be taken with a view to giving public notice of the Council's intention to provide 132 additional public elementary school places for subdivisions T, Y, and Z of the Tower Hamlets (School Board) Division.

Appointment of Arbitrator.—The Education Committee recommended, and it was agreed—

"That Mr. John Slater, of 46, Berners-street, W., be appointed as arbitrator between the Council and the trustees of St. John's Church, to determine (i.) the compensation, if any, which the trustees should receive in respect of alleged damage sustained by the St. John's Church and the St. John the Evangelist non-provided school (Holborn), resulting from the erection of the Central School of Arts and Crafts and the London Day Training College (Holborn); and (ii.) the sum to be paid by the Council for a right to light in perpetuity over the yard at the west end of St. John's Church. . . ."

Housing.—The Housing of the Working Classes Committee reported that forty-one additional cottages, containing accommodation for 344 persons, have been completed on section A of the Norbury estate. Accommodation for 732 persons in ninety-three cottages has now been provided on the estate.

Paving Works, Fulham.—The Improvements Committee recommended, and it was agreed, that expenditure on capital account not exceeding 4,770*l.* be sanctioned in respect of paving, etc., works in High-street, Fulham.

Proposed Widening, Archway-road.—The Improvements Committee recommended, and it was agreed, that the Islington Metropolitan Borough Council be informed that the Council is not prepared at the present time to take any action with regard to the suggested widening of Archway-road, Holloway-road, Junction-road, and Highgate-hill.

Holborn to Strand: Church of SS. Anselm and Cecilia.—The Improvements Committee recommended, and it was agreed, that the elevation of the proposed new church of SS. Anselm and Cecilia, with presbytery adjoining, proposed to be erected on a site in Kingsway, be approved.

London County Council (General Powers) Bill, 1907.—The Parliamentary Committee reported as follows:—

"We have had under consideration the provisions contained in the Council's General Powers Bill of this session, which stands for second reading in the House of Commons on April 11, 1907. Many of the powers sought in the Bill are highly controversial, and are opposed by a number of local authorities and other petitioners.

The controversial proposals referred to which appear to us to give rise to the greatest difficulty are the following:—

To enable the Council to prohibit the sale of milk from any dairy situated within or without the county where the medical officer suspects that cases of infectious disease within the county occurring in more than one sanitary district are attributable to the milk supplied from such dairy. (Clause 32.)

. . .

To enable sanitary authorities, with a view to prevent the spread of infectious disease, to require proprietors of laundries to furnish lists of their customers. (Clause 37.)

To require the provision of accommodation for the cooking and storage of food in tenement houses on each story. (Clause 39.)

To prohibit the sorting and sifting of house refuse by hand. (Clause 40.)

To apply sanitary regulations in respect of premises used for the sale, etc., of food for human consumption. (Clause 41.)

To make by-laws for regulating the businesses of fried fish vendors, fish curers, and marine store dealers. (Clause 42.)

Ancillary provisions in connexion with the clauses above mentioned. (Clauses 43 to 48.)

To enable the metropolitan borough councils at their discretion to establish milk depôts and to provide and sell in their respective districts milk for the food of infants. (Clauses 49 to 51.)

To enable the Council to cater for the occupants of its three existing lodging-houses and for any like lodging-house to be erected. (Clause 84.)

The progress of the Bill in Parliament has already been retarded, and we understand that decisions with regard to the above matters should be arrived at without delay, the second reading having been several times postponed. The Bill contains many important provisions of a non-controversial character, including such matters as extensions of time for the exercise of powers already acquired, and it is therefore of great importance that the Bill should be passed into law. We are advised that any further postponement of the second reading stage might imperil the passage of the Bill this session.

We are well aware of the importance of the several proposals to which we have called attention, but we feel that it is necessary that the Council should, after the newly-constituted committees concerned shall have been consulted, have an opportunity of discussing and coming to a decision upon the proposals. Moreover, the controversial portions of the Bill are strongly opposed on second reading by local authorities both within and without the county.

We think that, having regard to all the circumstances, the Council would be well advised to omit from the Bill for the present session the clauses referred to.

We recommend:—

(*a*) That Part V. of the Council's General Powers Bill, 1907 (clauses 32 to 48 inclusive*), be deleted from the Bill.

(*b*) That Part VI. of the Council's General Powers Bill, 1907 (clauses 49 to 51 inclusive), relating to milk depôts, be deleted from the Bill.

(*c*) That clause 84 of the Council's General Powers Bill, 1907, with regard to catering at the Council's lodging-houses, be deleted from the Bill."

After considerable discussion, the recommendations were agreed to.

Tramways and Improvements Bill.—The same Committee recommended that the proposals with regard to tramway No. 1, from the present terminus in Hampstead-road along Tottenham-court-road to Francis-street, be deleted from the London County Council (Tramways and Improvements) Bill, 1907.

New County Hall.—The Establishments Committee reported as follows:—

"Several questions having reference to general details have been raised by intending candidates in the competition for the proposed new County Hall, and in view of the likelihood of others being received we have thought it desirable to give instructions for a circular notice to be sent to competitors to the effect that any requests for information must be addressed to the assessors at the County Hall in the form of separate questions, on or before Wednesday, May 1, 1907, after which date no further questions will be considered. Those questions to which it is necessary to return a reply will be answered, and the information given in such reply will be communicated to all intending competitors. The information so given will then form part of the conditions governing the competition."

Theatres, etc.—The following proposals were, on the recommendation of the Theatres and Music Halls Committee, agreed to:—

"Arrangements in connexion with the Office Furniture Exhibition proposed to be held at Olympia (Mr. E. D. Robbins) and lift proposed to be erected at the premises in connexion with the forthcoming International Building Trades Exhibition (Mr. F. H. Payne).

Works in connexion with the stalls seating proposed to be executed at the Palace Theatre of Varieties, Shaftesbury-avenue (Mr. J. Emblin-Walker).

Intake rooms for the electric services at the Piccadilly Hotel, Piccadilly (London Electric Supply Corporation, Ltd.).

* Clause 38, referring to water supply on each story of tenement houses, was allowed to stand after discussion.

Improving the sighting of the gallery at the Putney Hippodrome, Felsham-road (Messrs. F. Matcham & Co.).

Installing automatic drums for working the flies at Wyndham's Theatre, Charing-cross-road (Mr. E. Lytton)."

Having transacted other business, the Council adjourned for the Easter recess.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses :—

Lines of Frontage and Projections.

Clapham.—Five houses on the western side of Old Town, Clapham, southward of Lydon-road (Mr. A. P. Lambert for Mr. H. G. Blackmore).—Consent.

Hammersmith.—That the application of Mr J. H. Richardson for an extension of the periods within which the erection of buildings on the northern side of Uxbridge-road, westward of Providence-place, was required to be commenced and completed, be granted.—Consent.

Hammersmith.—A one-story shop in front of No. 254, King-street, Hammersmith (Mr. G. Trotman for Messrs. Kennedy & Clarke).—Consent.

Hammersmith.—The retention of an illuminated sign in front of No. 235, Hammersmith-road, Hammersmith (Messrs. W. Cole & Sons).—Consent.

Hampstead.—A deviation from the plan approved under sect. 22 of the Act for the erection of additions to "The Old Mansion," Frognal, Hampstead, so far as relates to an increase in the height of the addition (Mr. G. Hornblower for Mr. E. P. Musmann).—Consent.

Hampstead.—An addition to a porch in front of No. 13, Arkwright-road, Hampstead (Mr. J. D. Hunter for Mr. E. Sondheim).—Consent.

Kensington, South.—That the Council, on the application of Mr. T. Cooper and in the exercise of its powers under sects. 22 and 73 of the Act, do consent to the retention of a projecting shop front at No. 48, Beauchamp-place, Brompton-road, Kensington.—Consent.

Lambeth, North.†—An iron and glass porch in front of the Royal Waterloo Hospital for Children and Women, Waterloo-road, Lambeth (Messrs. Waring & Nicholson for the trustees of the hospital).—Consent.

Lewisham.—Retention of two one-story shops upon the site of "Clune House," on the northern side of Sydenham-road, Lewisham (Mr. S. C. Hart for Mr. G. Matthews).—Consent.

Marylebone, West.—The retention of a projecting iron and glass shelter in front of No. 62, Finchley-road, St. Marylebone (Mr. J. M. Kennard for Mr. J. J. Joicey).—Consent.

Norwood.—Projecting porches in front of proposed flats on the eastern side of Lyham-road, Brixton (Mr. H. J. Capell for Mr. A. E. Peacock).—Consent.

Paddington, South.—Enclosures to the sides of a porch in front of No. 62, Porchester-terrace, Paddington (Messrs. Gale, Gotch & Leighton for Mr. H. W. Brooks).—Consent.

Rotherhithe.—Buildings on the southern side of Ilderton-road, Rotherhithe, with the western flank to abut upon the eastern side of Bramcote-road (Messrs. J. T. Bressey & Son for Mrs. E. S. Wellby).—Consent.

St. George, Hanover-square.—Balconettes in front of No. 1, Clarges-street, Piccadilly (Messrs. Blow & Martin).—Consent.

St. Pancras, South.—Retention of an iron and glass roof over the area in front of No. 4, Percy-street, St. Pancras (Mr. G. Vernon).—Consent.

Strand.†—A porch in front of No. 10, St. James-street, Strand, and the erection of enclosure James-street, Strand, and the erection of enclosures to a portico on the flank frontage of such building in King-street (Messrs. E. Runtz & Ford).—Consent.

Wandsworth.—Retention of wooden oriel windows and porches to six houses on the western side of Braxted-park, Wandsworth (Mr. P. C. Davies).—Consent.

Hammersmith.—An addition to Nos. 2 and 2A, Blomfield Villas, Blomfield-road, Hammersmith (Messrs. Macintosh & Newman for Mr. E. J. Clayton).—Refused.

Hampstead.—Buildings on the south-western side of Finchley-road, Hampstead, northward of Fairfax-road (Mr. R. L. Pearce for the Middlesex Building Company).—Refused.

Islington, East.—An addition at the rear of No. 338, Holloway-road, Islington, to abut upon the north-western side of Loraine-road (Mr. J. Wallis Chapman for Messrs. Jones Brothers (Holloway), Ltd.).—Refused.

Lewisham.†—A shop front in front of Nos. 63 and 65, Engleheart-road, Catford (Mr. W. Stewart for Messrs. Mann, Crossman, & Paulin, Ltd.).—Refused.

Lewisham.—A one-story shop in front of No. 346, High-street, Lewisham (Messrs. W. Goddard & Co. for Mr. G. E. Beaumont).—Refused.

Marylebone, East.—An iron and glass shelter at the rear of No. 1, Albany-street, St. Marylebone, to extend over Albany-mews (Messrs. Brown & Barrow for Messrs. Friswell, Ltd.).—Refused.

St. Pancras, South.—The retention of a projecting sign in front of No. 4, Percy-street, St. Pancras (Mr. W. Gutmann).—Refused.

Width of Way.

Hackney, Central.—Retention of a building at the rear of No. 169, Haggerston-road, Hackney, at less than the prescribed distance from the centre of the roadway of Frederick-place (Messrs. Woodrow & Helsdon for Mr. E. H. Williams).—Consent.

Rotherhithe.†—An addition to the Rotherhithe Amicable Society's school, on the north-western side of Adam's-gardens, Rotherhithe, at less than the prescribed distance from the centre of the roadway of Adam's-gardens (Mr. R. Page for the trustees of the school).—Consent.

Wandsworth.—Three houses on the southern side of Iron Mill-place, Garratt-lane, Wandsworth, at less than the prescribed distance from the centre of the roadway of the street (Mr. F. Rashbrook for the trustees of the late David Mitchell and himself).—Consent.

Width of Way and Lines of Frontage.

Islington, West.†—A building on the southern side of George's-road, Islington, to abut also upon the eastern side of Adam's-place, at less than the prescribed distance from the centre of the roadway of Adam's-place (Mr. G. H. Lovegrove for Mr. J. Pinchbeck).—Consent.

Marylebone, West.—The rebuilding of No. 53, Bryanston-street, St. Marylebone, at less than the prescribed distance from the centre of Cumberland-mews (Messrs. Hudson & Hunt for the Church Army).—Consent.

St. Pancras, West.—The retention of iron railings in front of Nos. 105 and 111, Euston-street, St. Pancras, within the prescribed distance from the centre of the roadway of the street, and the retention of a projecting crane at the second floor level (Messrs. Searle & Searle for Messrs. Sturtevant & Co.)—Consent.

Wandsworth.—Retention of two shop fronts in front of buildings on the northern side of Shrubbery-road, Wandsworth (Mr. E. L. Schneider for Mr. W. Wallis).—Consent.

Wandsworth.—Two houses on the western side of West Hill-road, Wandsworth (Mr. E. King).—Consent.

Westminster.—An addition at the rear of No. 2, Brechin-place, Westminster, at less than the prescribed distance from the centre of the roadway of Gloucester-road (Messrs. Carter & Wise for Mr. W. O. Danckwerts).—Consent.

Islington, East.—A three-story building on the northern side of Ronald's-road, Highbury, flanking also upon the western side of a mews leading out of the northern side of Ronald's-road (Mr. H. J. White for Mr. A. E. Bailey).—Refused.

Kensington, South.—The erection of a projecting one-story addition in front of No. 3, Newcombe-street, Kensington (Mr. E. W. Fagg for Professor F. T. G. Hobday).—Refused.

Width of Way, Space at Rear and Projections.

Hammersmith.—A building on the northern side of Glenthorne-road, Hammersmith, eastward of Dalling-road, at less than the prescribed distance from the centre of the roadway of Glenthorne-road, to an increased height on the space at rear and with a projecting oriel window on the flank (Mr. A. W. Hudson for Messrs. Gruntwag & Morton).—Consent.

Lines of Frontage and Space at Rear.

Dulwich.—Projecting one-story porches in front of eleven houses on the south-western side of Holmdene-avenue, Dulwich, and do also permit the erection of four of such houses with irregular open spaces at the rear (Messrs. H. Wakeford & Sons for Messrs. J. & R. Bax).—Consent.

Dulwich.—Houses in Azenby-square, Camberwell (Mr. G. P. Pratt for Mr. A. Aldridge).—Refused.

Lines of Frontage and Construction.

Clapham.—The retention of a cycle shed, of a temporary character, on the flank of No. 111, Broomwood-road, Clapham, abutting upon Wroughton-road (Miss F. Higgins).—Consent.

Marylebone, East.—The retention of two show-cases in front of No. 34, Finchley-road, St. Marylebone (Mr. W. E. Axtell).—Consent.

Norwood.—The retention of an iron and glass shelter of a temporary character in front of No. 160, Knight's-hill-road, Norwood (Messrs. Parr & Sons for Mr. Carl Hentschel).—Consent.

Paddington, North.—The retention of a wood and iron bar room of a temporary character in front of the "Hero of Maida" public-house, Nos. 435 and 437, Edgware-road, Paddington (Messrs. Gardiner & Theobald for Messrs. Meux & Co.).—Consent.

Width of Way, Line of Frontage, and Construction.

Kensington, South.—The erection of a bicycle-house on the flank of No. 36, Campden-hill-gardens, Kensington, abutting upon Aubrey-walk (Messrs. Humphreys, Ltd., for Mr. W. Wallace, K.C.).—Refused.

Formation of Streets.

Lewisham.—That the Council do consent to the application of Mr. A. W. Osborn, on behalf of Mr. J. Watt, for an extension of the period within which the roadway of a proposed street on the Summerfield estate, Catford, to lead from Ravensbourne-park-road to Ravensbourne-park, was to have been defined and thrown open to the public as a highway.—Consent.

Lewisham.—That an order be issued to Mr. P. Roche sanctioning the formation or laying-out of a new street on a site at the rear of buildings on the eastern side of Springbank-road, Hithergreen, in continuation of a street approved by the Council, and also sanctioning in connexion therewith the erection of a greenhouse.—Consent.

Norwood.—That an order be issued to Messrs. G. H. & A. W. J. Stringer, sanctioning the formation or laying-out of new streets for carriage traffic to lead out of the eastern side of Upper Tulse-hill, Norwood.—Consent.

Hammersmith.†—That an order be issued to Mr. R. B. Grantham & Son, refusing to sanction the formation or laying-out of two new streets for carriage traffic in continuation of Bloemfontein-road and Sawley-road, Hammersmith.—Refused.

Cubical Extent.

Hackney, Central.—The retention of a covered entrance united to a motor garage at the premises of the Motor Bus Company, Ltd., whereby the covered entrance and motor garage as united exceed in extent 250,000, but not 450,000, cubic ft. (Messrs. F. Boreham & Son for the Motor Bus Company, Ltd.).—Consent.

Space at Rear.

Southwark, West.—A modification of the provisions of sect. 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a building on the site of Nos. 45 and 47, Union-street, and No. 34, Red Cross-street, Southwark, with an irregular open space at the rear (Messrs. E. Runtz & Ford for the Hon. Eleanor Hicks-Beach).—Consent.

The recommendations marked † are contrary to the views of the local authorities.

BOOKS RECEIVED.

PUBLIC LIBRARIES. By Annan L. Champneys, B.A., Architect. (B. T. Batsford. 12s.)

HAWORTH'S PRACTICAL TIMBER MEASURER. (Offices of the *Timber News*. 1s.)

THE PRINCIPLES OF ARCHITECTURAL DESIGN. By Percy L. Marks, Architect. (Swan Sonnenschein & Co.)

Trade Catalogues.

THE Carron Company have sent us their Catalogue entitled "Carron General Castings." It is a business-like catalogue of sixty pages, and includes examples of pig-troughs, garden-tables, rollers, scrapers, gate-fittings, balusters, gullies, rainwater pipes, soil-pipes, skylights, and other iron work. The scrapers and umbrella-stands are of the usual "ornamental" description.

Adamant & Asphalte (Birmingham), late The Adamant Co., have sent us an interesting catalogue containing a number of photographs showing the application of their adamant plaster in ornamental ceilings, columns, cornices, etc. The catalogue also includes a number of illustrations of cast plaster enrichments, many of which are of much better design than usual in catalogues of this description. Illustrations of fire-resisting floors, ceilings, and partitions are also given, together with coloured illustrations of tile panels, etc.

We have received from the Safety Tread Syndicate a catalogue containing illustrations showing the application of Mason's patent treads to staircases of wood, stone, concrete, etc., and also of an improved constructional tread which can be applied to worn stone steps or supplied with flanges for building into the brick walls. This tread is also used for attaching to brackets bolted to brickwork, and by its means a fire-resisting staircase can be easily and rapidly constructed.

Messrs. Longden & Co. (Sheffield) have sent us their catalogue containing many illustrations of fire-grates of various kinds, including interiors, hob-grates, cast-iron mantels,

dog-grates, and cast-iron fire-backs copied from old examples. Special mention may be made of the "Hearth" fire-grate, the special feature of which is the curved bottom-grate rising from the back of the hearth-brick to the top of the economiser in front.

The General Iron Foundry Company have sent us their 1907 catalogue of kitchen ranges, steam ovens and pans, bakers' ovens, portable boilers, laundry stoves, fire-grates and mantels, cast-iron drain pipes and fittings, soil-pipes, rainwater pipes, and manhole-covers, cast-iron windows, galvanised-iron tanks and cylinders, railing and gates, stable and cow-house fittings, heating apparatus boilers, radiators, valves, etc. The architect and builder will find it a very convenient work of reference. It contains over 600 pages, and is fully illustrated and well bound.

Mr. Thomas Potterton has sent us a small catalogue showing his "Rex" and "Duchess" kitcheners fitted with special boilers for taking full advantage of the heat of the kitchen fire. He also shows the "Maisonette" hob register fitted with a high-pressure boiler for domestic supply or heating, and two systems of hot-water services and radiators heated from the kitchen boiler.

Messrs. Hartley & Sugden (Halifax) have sent us their new catalogue of cast-iron and wrought-iron boilers for heating apparatus and for domestic hot-water supplies. A special feature is made of the "White Rose" cast-iron sectional boiler, but many other types are also shown, including boilers and calorifiers for steam-heating. Examples of radiators of various kinds, valves, etc., are also given.

Messrs. Messenger & Co. (Loughborough) have sent us their catalogue of horticultural buildings. It is divided into three sections, the first containing photographs of conservatories, some of which are well designed, and in some cases the architects' names are given; the second section contains line drawings of ranges of vineries, plant and forcing-houses, etc.; and the third section deals with smaller houses of the same class, and with peach-houses, etc. In this section short specifications and prices are given.

The Buttermere Green Slate Company have sent us a very well-produced booklet entitled "Concerning English Green Slates." It contains coloured illustrations of the slates quarried by the Company at Coniston, Buttermere, and Elterwater, and half-tone prints of their quarries at Coniston and Elterwater, and a coloured illustration of the quarries at Honister Pass. The booklet is well worth the attention of architects.

WESTMINSTER CITY COUNCIL.

THE usual fortnightly meeting of the above Council was held on Thursday, when the following matters were dealt with :—

London Building Acts (Amendment) Act, 1905.—The Law and Parliamentary Committee reported having received a letter from the Fire Protection Committee of the manufacturers' section of the London Chamber of Commerce to the effect that the London County Council's circular on the above Act was ambiguous and to some extent misleading. They pointed out that as many people may assume that the County Council can impose requisitions which they have no power to do under the Act, it is urged that the circular published in July last should be withdrawn and redrafted in explicit terms, discriminating between the powers and the application of the Factory Act and the Building Acts (Amendment) Act, and amending the principles which the County Council have laid down as a general guide in order that they may be made consistent with the varied scope and application of the two Acts. The Chamber ventured to hope that they might have the support of the Borough Councils in this matter.—It was agreed to inform the Chamber that Mr. Pilditch, the Chairman of the Committee, who was now a member of the London County Council, had promised to personally interest himself in the matter with a view to its being brought before the proper committee of that body.

Tenders for Annual Supplies and Works.—On the recommendation of the Works Committee, it was agreed to enter into contracts for one year till March 31, 1908, for the following matters :—*Ashphalt Carriage-way Repairs*—Limmer Ashphalte Paving Company. *Ashphalt Footway Repairs*—Bradshaw & Co. and the French Ashphalte Company. *Ballast and Sand for Paving*—H. Boyer, H. Covington & Sons, J. Mowlem & Co., and the Thames Sand Dredging Company. *Bricks*—Broad & Co. Ltd., H. Sabey & Co. *Broken Granite*—A. & F. Manuelle and J. Mowlem & Co. *Granite Kerb*—Brookes, Ltd., and Tilbury Contracting Company. *Limewhiting*—J. R. Sims. *Minor Sewerage and Drainage Work*—J. Mowlem & Co. *Painting Lamp Posts*—S. Pontitex & Co. *Pine and Fir Paving Blocks*—Improved Wood Pavement Company. *Portland Cement*—Broad & Co., Ltd. *Sandstone Flags*—H. Heys & Co., Ltd. *Sett-paved Carriage-way Repairs*—J. Mowlem & Co. *Painting at Public Urinals*—B. &. A. Gale and J. R. Sims. *Street Gullies Construction*—J. Mowlem & Co. and D. R. Paterson, Ltd. *Street Mason's Work*—J. Mowlem & Co. *Wood-paved Carriage-way Repairs*—Improved Wood Pavement Company and J. Mowlem & Co. *Flat Granite Channelling, etc.*—D. R. Paterson, Ltd. *Stoneware Goods*—J. H. Turney & Lisney and Young & Son.

Repairs to Trenches in Macadam Roads.—A letter was received from the Gas Light and Coke Company with reference to the Council's charges for reinstating trenches in macadam roads stating that the Council's specification for such work was too onerous to allow of a reasonable quotation being forthcoming. The City Engineer had submitted and revised specifications which retained the condition that all trenches shall be steam-rolled, but the price to be inserted in the schedule is to be for "repairs to trenches at per yard super. whatever the length or area of the trench may be," instead of prices for more than 5 yds. and less than 5 yds., and for a minimum charge, included in the existing contract.

Wardour Street Widening.—It was agreed that the Council should forthwith widen Wardour-street by setting back Nos. 89 and 91.

Correspondence.

ALDWORTH CHURCH.

SIR,—In the interesting account of Aldworth Church and its effigies in your issue of February 9 the writer of the description omits to mention one article, connected with the De la Beche family and its effigies, which is of uncommon interest. That is the XIVth century silver seal of the Lady Isabella de la Beche, now in the custody of the vicar of the parish. It is a finely modelled and deeply engraved seal, with three coats of arms concentrically arranged, surrounded by the inscription "S. Isabellae de la Beche." This was turned up by a ploughman named George Row on Beche Farm, in the parish of Aldworth, circa 1870, was purchased by the then vicar, the Rev. F. L. Lloyd, B.D., and was by him bequeathed to his successors, the vicars of the parish.

LLEWELYN LLOYD.

SHRINKAGE OF TIMBER.

SIR,—I have hitherto understood that no timber will shrink endwise except the New Zealand Kauri pine, but am assured by several practical men, both carpenters and joiners, that other woods will shrink endwise in an appreciable degree. As this affects a most important question, I should be glad if any of your readers can inform me if wood does really shrink other than transversely.

J. B.

The Student's Column.

ELECTRIC LIGHTING AND HEATING.—XI.

Alternating Currents—The Oscillograph—Effective Values — Impedance — Power Factor—The Measurement of Power—The Wattmeter—Transformers.

ALTERNATING CURRENTS.—The rotation of the armature of an alternator causes a rapid periodic change in the flux of induction through its coils, and hence the potential difference between the collector rings periodically varies. If the terminals of the machine be connected together by a resistance a periodically varying current will flow in this resistance. The time that this current takes to go through its cycle of values is called the period of the current, and the number of periods per second is called the frequency. During half a period the alternating current flows in one direction, and during the next half in the opposite direction. If the period were four seconds, then in the first second the current would increase to its maximum value, which we suppose to be 10 amperes, and in the next second it would fall to zero again. In the third second it would vary from 0 to —10 amperes, and in the fourth from —10 to 0. If we had a quick reading direct current ammeter, which read on either side of the zero, depending on the direction in which the current was flowing, we could follow the fluctuations of the current by noticing the motion of the needle of the instrument. In practice, however, the current goes through all its values in about the fiftieth part of a second. Hence to study the way in which the current varies a very special instrument called an oscillograph is employed.

The Oscillograph.—The oscillograph (Fig. 14) may be roughly described as a moving coil galvanometer, the free period of

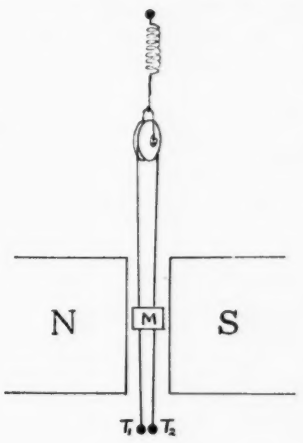


Fig. 14.

vibration of which is only about the ten-thousandth part of a second. It consists essentially of a very small light mirror M attached to two delicate phosphor bronze strips stretched vertically in the field of a powerful permanent or electro-magnet. The alternating current passes up one strip and down the other, and hence the strips are pulled opposite ways and the mirror is deflected. To make the instrument dead beat, the mirror is immersed in a viscous oil. A beam of light from an arc lamp is reflected from the mirror on to a screen, and the horizontal displacement is proportional to the current. If a photographic screen moving vertically be employed, we can get a permanent record of the deflexions, and, therefore, also of the currents during the interval of time the screen is moving, and we are thus enabled to find the law of variation of the current. In general, it is found that the current is a harmonic function of the time, that is, its magnitude varies according to the same law as the displacement of the lowest point of a swinging pendulum from its central position.

Effective Values.—If we pass an alternating current through a tangent-galvanometer there is no deflexion of the needle, as the magnetic impulses in opposite directions are equal, and take place with such rapidity that the needle merely measures their mean value, which is zero. If, however, we pass the alternating current through a hot wire ammeter of resistance r the power expended in heat at any instant is i^2r where i is the instantaneous value of the current. Hence the deflexion of the instrument will be proportional to the mean value of i^2r. If we find that a direct current C gives the same deflexion, then C^2r must equal the mean value of i^2r, and thus since the ammeter is calibrated with direct current, and therefore reads C, the deflexions of the pointer give the square root of the average values of i^2 taken over a period. This is sometimes called the root mean square, or simply the R.M.S. value of the current. It is also called the effective value of the current since a direct current of the same value would produce the same heating effect.

In an exactly similar way a suitable voltmeter connected with an alternating current circuit reads the square root of the mean of the squares of the values of the applied pressure. We see, therefore, that on alternating current circuits the indications of the instruments merely give us "effective values." They give us no hint as to the law according to which the quantities vary.

If we take a record of the instantaneous values of the volts and amperes in an alternating current circuit by means of an oscillograph, we get curves similar to those shown in Fig. 15. In this diagram time is measured horizontally, and the ordinate at a

point on a curve, that is, the line drawn from the point perpendicular to the axis of time, gives the value of the volts or amperes at the instant specified by the distance of the foot

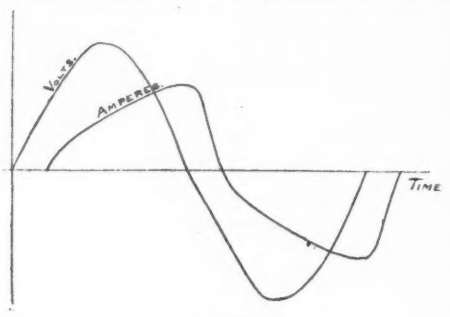


Fig. 15.

of this perpendicular from the origin of time. It will be seen that the shapes of the curves are different, and a knowledge of these shapes is often a great help to the engineer, as anomalous results in the working of motors and arc lamps can often be explained by changes in the shapes of the waves of current and pressure.

Impedance.—Although Ohm's law holds for the instantaneous values of the volts and amperes in an alternating current circuit, yet it has to be modified when we deal with the effective values of the volts and the amperes in a circuit. If A and V denote the ammeter and voltmeter readings, respectively, then whatever the law according to which the current varies, V/A is defined to be the impedance of the circuit. Impedance is usually denoted by Z, and thus

$$A = V/Z,$$

is the equation for the current. The impedance varies with the resistance and inductance of the circuit, and also with the frequency and method of variation of the alternating current.

If the current and pressure follow the harmonic law, we have

$$A = V/(R^2 + 4\pi^2 f^2 L^2)^{\frac{1}{2}}.$$

In this equation A and V are the readings of the ammeter and voltmeter respectively, f is the frequency of the alternating current, and π, in accordance with the invariable mathematical convention, represents the ratio of the circumference of a circle to its diameter, and is therefore 3·142 nearly.

We see that, instead of dividing the voltage by the resistance R in order to get the current, we have to divide it by a larger quantity, the value of which depends both on the inductance of the circuit and on the frequency of the alternating current. If the frequency and inductance be small, the departure from Ohm's law is slight, but if they be large the current practically varies inversely as fL, and is almost independent of the resistance of the circuit.

Power Factor.—An inspection of Fig. 15 will show that the electromotive force and the current, the graphs of which are shown, are not in step with one another, that is, they are not zero at the same instant. For an appreciable fraction of the period the current flows against the electromotive force, and during this time work is being restored to the supply mains. Hence the average value of the total electric power expended on the circuit will be less than if the current and the pressure were in step, although the effective values of both remain the same. It follows that the product of the effective volts and the effective amperes does not necessarily give us the power being expended on an alternating current circuit. It can be shown that this product fixes a superior limit to the power expended, that is, the actual power must be less than this product.

If we measure by a suitable wattmeter the true power P expended, then the ratio of P to VA is called the power factor of the circuit. Since its maximum value is unity, it may conveniently be denoted by cos ϕ and ϕ may be defined as the phase difference between the current and the pressure. If it were possible to have a circuit of which the power factor was zero, no power would be expended on the circuit, although we might have a large current flowing and a large reading on the voltmeter between the terminals of the circuit. In practice, it is possible to have circuits in which the power factor is as low as 0·01. For instance, a condenser connected between the terminals of a high-pressure alternator will take a large current, but the power expended in heating it will be very small. Similarly, when a "choking coil," that is, a coil of large inductance, but negligible resistance, is connected between a main and a consuming device, the power expended in heating it may be less than a twentieth of the product of the voltage between the terminals and the current flowing through it.

The Measurement of Power.—The measurement of power in alternating current circuits is much more difficult than in direct current circuits. In the latter case, it can always be done by multiplying the reading of the ammeter in the circuit by the reading of the voltmeter between the terminals of the load. For instance, when the current is 10 amperes, and the pressure is 100 volts, the power expended is 10 × 100, that is, 1,000 watts or 1 kilowatt. With alternating currents, however, the power cannot be measured in this way, unless we are certain that the load is non-inductive. If it consist merely of glow lamps, the product of the volts and amperes may for all practical purpses be taken as equal to the power, but if the load consist of motors or arc lamps, this product may be 20 or 30 per cent. greater than the true power. In this case we have to use a suitable wattmeter.

The Wattmeter.—In the usual form of electromagnetic wattmeters, there are two coils. One of these is fixed and carries the main current. The other, which is movable, is in series with a high, nearly non-inductive, resistance, and is placed as a shunt across the circuit. The coils are placed at right angles, and, hence, when there is a current in both, a force acts, tending to turn them so that their axes coincide, the currents flowing round each in the same direction. The torque on the movable coil is proportional to the product of the two currents, provided that it be always kept in the same position. This is done by bringing it back to its initial position by means of a torsion head connected with it by a spiral spring, so that the angle turned round by the pointer attached to the torsion head is proportional to the torque acting on the coil. Hence, since the instantaneous value of the current in the movable coil is proportional to the applied voltage, we see that the value of the torque at any instant is proportional to the power. As the deflexion of the instrument measures the mean torque, we see that it also measures the average power expended.

Errors arise in practice owing to the difficulty of making the inductance of the "volt coil" absolutely negligible. Owing to this cause large errors may be introduced when measuring power in circuits which act like choking coils or condensers and have consequently small power factors.

Transformers.—A transformer can be used either to raise or lower the pressure of the supply. From the mechanical point of view its construction is very simple. If a bundle of iron wires be bent into the form of a ring (Fig. 16), and two coils of insulated copper

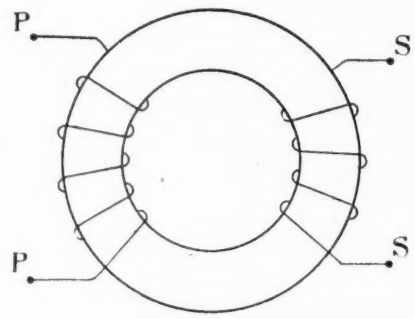


Fig. 16.

wire be wound round it, we may use this piece of apparatus as an alternating current transformer. It will be seen that it has three fundamental parts, two coils of insulated copper wire, and an iron core linking them together magnetically. We may apply the alternating P.D. to either of the coils, and take power from the other. The coil to which the alternating P.D. is applied is called the primary coil, and the other is called the secondary.

If V be the reading of the voltmeter connected across the terminals of the primary coil, and V_2 be the voltage across the secondary, we have approximately

$$V_1/V_2 = n_1/n_2, \text{ or } V_2 = (n_2/n_1)\, V_1.$$

Where n_1 and n_2 are the number of turns in the primary and secondary coils respectively. Since n_2 may be either greater or less than n_1, V_2 may be greater or less than V_1. When V_2 is greater than V_1, the transformer is called a "step-up" transformer; and when V_2 is less than V_1, a "step-down" transformer. As an example, let us suppose that n_2 is 50, n_1 is 1,100, and that V_1 is 2,400 volts. In this case V_2 = (50/1,100) 2,400 = 108 volts nearly.

The power taken by the lamps or consuming devices connected with the secondary terminals of a transformer is called the load on the secondary. When the secondary circuit is switched off, the transformer is said to be on open circuit. In this case the voltage V_2 across the secondary terminals has its maximum value $(n_2/n_1)\, V_1$. As the load on the secondary is increased V_2 diminishes, and at full load V_2 is 98 per cent. of its initial value.

It will be seen, therefore, that as the load is increased the pressure of supply diminishes and consequently the light given by the lamps also diminishes. Since a diminution in the pressure of supply of 2 per cent. means a diminution of 10 per cent. in the light given out by the lamps, a greater voltage drop than 2 per cent. is inadmissible.

General Building News.

BAPTIST CHURCH, ROCHESTER.—The foundation-stones of a new Baptist church, which is being built in Maidstone-road, Rochester, were laid recently. The church will be in the transitional Early English style, and accommodation will be provided for 547 persons. The architect is Mr. G. E. Bond, and the contract was entrusted to the late Mr. G. Gates, of Frindsbury.

MISSION CHURCH, CADOXTON.—The Theatre Royal at Cadoxton is to be converted into a mission church by flooring the open spaces between the galleries, and the ground floor, including the stage, orchestra, and auditorium, are to be utilised for Sunday school purposes. Plans have been prepared by Mr. G. E. Halliday, the diocesan surveyor.

CONGREGATIONAL CHAPEL, TON.—The memorial stones of the New Bethesda Chapel, Ton (Rhondda), were laid on the 21st inst. The building comprises a chapel, with gallery, minister's and deacons' vestries, and a large vestry at the rear, with classrooms and library above. Accommodation is provided in the chapel for about 950 persons, in the vestry for about 300, and in the classrooms for about 200. The cost will be about 5,500*l.* The building was designed by Mr. W. D. Morgan, architect, Pentre, and the contract carried out by Messrs. Hughes & Stirling, contractors, Bootle.

WESLEYAN CHAPEL, NAFFERTON.—A new chapel is being erected for the Wesleyan community at Nafferton. The architects are Messrs. Gelder & Kitchen, of Hull, and the contractors Messrs. Price & Son, Doncaster, whose estimate is 1,850*l.* The front elevation is to be in rock-faced ashlar with Ancaster stone dressings. The chapel will be approached by seven steps, and from the ground floor to top of finial the height is about 40 ft. The sides of the buildings are faced with white hand-made kilns. The length of the chapel and school will be about 120 ft. The former will have accommodation for about 350 worshippers, and the stalls and other woodwork will be of redwood.

SYNAGOGUE, SALFORD.—On March 18 was laid the foundation stone of a synagogue, the first to be built in Salford. It will afford accommodation for 420 persons, and the cost amounts to about 6,000*l.* The plans and designs have been prepared by Mr. Delissa Joseph, of London.

PUBLIC SWIMMING BATHS, SEACOMBE.—New swimming baths are being erected for the Wallasey Urban District Council at Seacombe. The building contract has been let to Mr. Thomas Spencer, of Aintree, Liverpool, and the engineering contract to Messrs. Thomas Bradford & Sons, laundry engineers, etc., of Salford and Liverpool. The main elevations and entrances overlook the "Guinea Gap." Two swimming baths are provided. The first-class bath is nearest the river, with a water area of 75 ft. by 30 ft. A spectators' gallery surrounds this bath, and a club or gala room is provided in conjunction therewith. The second-class bath lies to the westward of the

first-class bath, with the laundry and boiler-house, etc., between the two. The water area of this bath will be 75 ft. by 27 ft. A number of ladies' and gentlemen's slipper-baths will be provided, as also the usual ticket-office, turnstiles, and superintendent's apartments. As the swimming baths are to be supplied with salt water from the Mersey, the necessary storage and filtration tanks, etc., will be provided to the north of the site. A feature will be the adoption of a recently introduced filtration and aeration circulating system, whereby the baths will be continuously cleansed of offensive matter. The District Engineer and Surveyor (Mr. W. H. Travers) prepared the plans.

CONCERT PAVILION, ABERDEEN.—A concert pavilion is to be erected at the Aberdeen Sea Beach. The building, which has been designed by Mr. John Rust, City Architect, measures 80 ft. by 40 ft., and is to be erected to the south of the swimming pond, between the road leading from the bathing station to Wellington-street and the Promenade. The following is a list of the contractors for the various works:—Mason, Messrs. Findlay & Henderson; carpenter, Messrs. Leslie & Hay; painter, Mr. W. L. Leslie; plumber, Mr. David Ogilvie; electric lighting, The Aberdeen Electrical Engineer Company, Ltd.

KIRKINTILLOCH, N.B.—New gasworks are about to be erected at Back o' Loch, to include a holder having a capacity of 500,000 cubic feet, with retort-house, workshops, sulphate of ammonia manufactory, and offices, etc., for the local gas commissioners, whose manager, Mr. William Wilson, prepared the plans.

NEW HOTEL, COLWALL.—The newly-erected Colwall Park Hotel has now been opened. The hotel is built in the half-timbered style, the ground floor walls being faced with sand-faced bricks and the upper stories with half-timbered stucco and fill hanging. The architect was Mr. Percy Smith, of Worcester.

WORKHOUSE INFIRMARY, NEWPORT.—A new workhouse infirmary is now in course of erection at Newport. Messrs. Fleeming & Son, of Wolverhampton and Wellington, are the architects, and Messrs. G. I. Muirhead & Co., of Newport, are the contractors. Provision will be made for twenty-nine beds in four wards. The cost, including building, furnishing, draining, and purchase of land, is estimated at 4,015*l.*

NEW HOTEL IN ENDSLEIGH-GARDENS, W.C.—The University Hotel, situate in Endsleigh-gardens, W.C., has just been opened. It contains 136 bedrooms and twenty-four bathrooms, and a restaurant, ballroom, reading, smoking, and billiard rooms are also provided. The decorations were carried out by Messrs. Maple & Co., and the architects were Messrs. Collcutt & Hamp.

MEMORIAL HOMES, FRODSHAM.—The John Fowler Memorial Homes for Boys and Girls, erected on the east slope of the Frodsham range of hills, overlooking the Weaver Valley, about a mile and a half from Frodsham, were opened a short time ago. The homes consist of two blocks, each containing two semi-detached houses. Each house accommodates a family group of twenty-five children, with their two sisters in charge, and has a living-room and dining-room, sisters' room, bathroom, etc. At the highest point of the amphitheatre, which is the general form in which the ground plan for the buildings has been arranged, a handsome lecture-hall with a tower has also been provided. Messrs. Gordon & Gunton, of London, were the architects, and the contracts have been carried out by the Waring White Building Company. The furniture and fittings of the houses and lecture-hall, which are of ash and oak, have been designed and executed by Messrs. Waring & Gillow.

THE GUILDHALL, CHICHESTER.—Mr. F. J. Lobley, the City Surveyor of Chichester, has prepared a report on the subject of the repair of the Guildhall in the Priory Park at Chichester. He states that he is unable to say that the building can be considered to be "safe," but at the same time points out that it has been practically in its present state, except as regards the west end, for many years past, and if not interfered with in any way whatever it might remain as it now is for a long time.

POST-OFFICE, SALISBURY. — New post-office premises have been erected in Castle-street Salisbury. The architect was Mr. H. N. Hawkes, of H.M. Works. Messrs. Moore and Co., of Trowbridge, were the builders.

MEMORIAL TOWER, BOURNEMOUTH.—A tower is being erected at the Congregational church in memory of the late Mr. Frank Braham. It will be composed of Purbeck stone walling, with Bath stone dressings and Portland stone staircase. The upper interior portion will form a ventilating chamber for the church. It will be surmounted by an octagonal spire, and the height to the top of the spire will be about 85 ft. The work is in the hands of Messrs. Jones & Seward, whilst Mr. T. Stevens is the architect. Mr. W. A. Hoare, of Bournemouth, is carrying out the masonry portion of the work.

CENTRAL FREE LIBRARY, HACKNEY.—On the 23rd inst. the foundation-stone of the central public library, in course of erection under the Public Libraries Act in Mare-street, Hackney, was laid. Mr. H. A. Crouch is the architect of the new building, which is being built at a cost of 12,000*l.*, given by Mr. Carnegie.

PUBLIC FREE LIBRARY, CAVERSHAM.—A public free library is in course of erection at Caversham, a suburb of Reading. Mr. W. G. Lewton is the architect of the building.

ENLARGEMENT OF THE COUNTY COURTHOUSE, BELFAST.—The County Council of Antrim and the Council of the County Borough of Belfast decided, towards the end of 1905, to build a new front to the courthouse, at a cost of 12,500*l.* The plans of Messrs. Young & Mackenzie were selected, and a contract entered into with Messrs. Robert Corry, Ltd. The additions to the building have been planned so as to form a new front, containing two new wings extending on each side of the hexastyle portico, and in front of the Crown and Record Courts, having a total length of 240 ft. The original building was designed by the late Sir Charles Lanyon, County Surveyor of Antrim, and opened in 1850. All the rooms in the new wings are heated with low-pressure hot water, special radiators being placed opposite each window, and this work has been carried out by Messrs. Musgrave & Co., Ltd. The new building is lighted by electric light supplied by Messrs. W. Coates & Son, Ltd., the consulting engineer being Mr. J. Woodside. All the floors are covered with cork carpet and plainly furnished, and this has been carried out by Messrs. Gillespie & Woodside. The blinds were supplied by Messrs. Bell & Mayrs, Ltd. The plumbing work was executed by Messrs. John Dowling & Sons.

ALMSHOUSES, UXBRIDGE.—New almshouses have been erected in Windsor-street, Uxbridge. The block has been built of brick, with red brick facings from the ground to the first floor, and cement and lime stucco from the first floor to the eaves of the roof. There are in all twenty tenements, ten on each floor, the approach to the upper rooms being by means of a stone staircase, leading right and left at the top to two upper "flats." Hand-rails are fixed to the staircase to help the people up and down. The roof is red-tiled and of gable design stuccoed between timbers. At the two ends of the buildings are washhouses. The architect was Mr. W. L. Eves, Uxbridge, and the work has been carried out by Mr. C. F. Kearley, of Uxbridge and Kensington.

Sanitary and Engineering News.

BILSTON (STAFFS.) SEWERAGE.—The new scheme is nearly completed for the construction at the Lunt of chemical precipitation and continuous filtration works, together with the laying down of intercepting sewers ranging from 9 in. to 40 in. in diameter, for a length of nearly 8 miles, at a computed cost of rather more than 50,000*l.* The plans, made by Mr. Baldwin Latham, M.Inst.C.E., have been carried out by Mr. Herbert Holloway, of Wolverhampton, contractor.

ARTERIAL DRAINAGE (IRELAND) COMMISSION.—Sir Alexander Binnie and his coadjutors on the Commission appointed two years ago to inquire into the practical working of the Drainage Acts have presented their report to Parliament. The Commissioners recommend the formation of conservancy boards, or joint committees of county councils for the areas which it is proposed to form, and that the existing system of acquiring land and water rights should be ameliorated, as being now costly, tardy, and vexatious. They also advocate the establishment of a drainage department to guide and control the smaller drainage authorities in Ireland, and they point out that an amendment of the Drainage Acts in force is urgently required for the initiation of new drainage works under the Codes of 1842 and 1863. In pursuance of the Codes as many as 183 districts have been formed, whilst the failure of operations is attributed partly to inherent defects in the scheme and mostly to changes brought about by the Land Law Act of 1881, as affecting the tenure of land.

Foreign.

FRANCE.—The Committee of the Société Nationale des Beaux-Arts (New Salon) propose to open a competition for the decorative setting of an opera, which is subsequently to be mounted in accordance with the first premiated design. There is also to be a competition in the design of theatre costumes.——M. Bertone, a former Prix de Rome, has been appointed architect to the Palais de l'Institut, in succession to M. Moyaux, who retires as superannuated.——A new dock basin is to be constructed at Trouville, at a cost of 2,200,000 francs.——A monument to Jules Ferry was inaugurated last Sunday at St. Dié.——Works are to be commenced at Cannes for the lengthening and raising of the west jetty of the port.——The Governor-General of Algeria has founded some studentships for the assistance of young artists desiring to study in that climate. They are to be competed for annually, and a villa has been secured for the accommodation of the competitors when necessary.——The jury in a competition for a monument to be erected at Sémur to the memory of victims the war of 1870, has awarded the first premium to the joint design of M. Gauquié (sculptor) and M. Guillaume (architect).——M. Tronchet has been commissioned to carry out the work necessary for the installation of the Ministère du Travail.——An exhibition of the works of Falguière, the sculptor, is to be arranged in a room in the Petit Palais. The collection will be completed by a portrait of the eminent sculptor by M. Carolus-Duran, and a bust by M. Rodin.——The Académie des Beaux Arts has awarded the Achille Leclère prize to M. Charles Boussois, a pupil of M. Pascal. The subject of the competition was "A Central Station for a Metropolitan Railway."

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Messrs. Griffin & Woollard, architects, have moved their offices from 34, Coleman-street, to Moira-chambers, 17, Ironmonger-lane, E.C. Their telephone number will remain the same as before.——Mr. J. Owen Bond, architect (Norwich), has removed his offices from 15, Upper King-street, to 29, Castle Meadow, Norwich.——Mr. G. C. Workman, the agent for the Coignet armoured concrete constructions system has removed his offices from 43, Chancery-lane, to 20, Victoria-street, S.W.

CHURCH BUILDING SOCIETY.—The Incorporated Society for Promoting the Enlargement, Building and Repairing of Churches and Chapels held its usual monthly meeting on the 21st inst., at the Society's House, 7, Dean's-yard, Westminster Abbey, S.W., the Rev. Canon C. F. Norman in the chair. Grants of money were made in aid of enlarging or otherwise improving the accommodation in the churches at Douglas, St. Matthew, Isle of Man, 50*l.*; Greenside, St. John-the-Evangelist, co. Durham, 55*l.*; Liscard, St. Mary, Cheshire, 20*l.*; Lower Halstow, St. Margaret, near Sittingbourne, Kent, 25*l.*; Marton, St. Margaret, near Lincoln, 20*l.*; Mere, St. Michael, Wilts, 15*l.*; Newcastle-on-Tyne, St. Augustine, 60*l.*; Onecote, St. Luke, near Leek, Staffs., 20*l.*; Silk Willoughby, St. Denis, near Sleaford, Lincs., 30*l.*, and West Walton, St. Mary, near Wisbech, Norfolk, 40*l.* Grants were also made from the special Mission Buildings Fund towards building Mission Churches at Marple Bridge, near Stockport, 30*l.*, and Warley Woods, near Birmingham, 10*l.*, making in all 50*l.* The following grants were also paid for works completed:—Southchurch, Holy Trinity, near Southend-on-Sea, 80*l.*; Dauntsey, St. James, near Chippenham, 25*l.*; Aberystwyth, St. Michael and All Angels, 100*l.*; Skirbeck Nicholas, near Boston, Lincs., 100*l.*; Lyons, St. Michael and All Angels, co. Durham, 10*l.*; Plumstead, St. Michael and All Angels, Kent, 100*l.*, and Brithdir, near Bargoed, Glam., 40*l.* In addition to this, the sum of 230*l.* was paid towards the repairs of twenty-four churches from trust funds held by the Society. The Annual General Court will be held on Thursday, May 16, at 3 p.m., at the Church House, when the chair will be taken by the Archbishop of Canterbury, President of the Society.

INTERNATIONAL CONGRESS OF HYGIENE, BERLIN.—The Committee of Organisation and the Local Committee have resolved to give the occasion to the members of the Congress to make themselves acquainted with the hygienic institutes of Berlin and its environs. The scientific meetings will not be extended longer than till 2 o'clock, in order that the afternoons may be reserved for the visits. By agreement with the presidents of the different sections, more than a hundred establishments have been selected, which can be visited during the Congress days, partly *ad libitum*, partly in groups under a special conduct. A "Hygienic Guide" will give a short description of the institutes in three languages.

LONDON COUNTY COUNCIL: NEW COMMITTEES.—The following appointments have been made to the new Standing and Special Committees:—Mr. P. E. Pilditch, architect and surveyor—Highways, and Local Government, Records, and Museums; Mr. W. Hunt, architect—Main Drainage, Works, and Appeal (Special and Statutory); Mr. G. Dew, carpenter—Asylums, Education, and Housing of the Working Classes; Mr. F. L. Dove, builder—Asylums, Establishment, and Parks and Open Spaces; Mr. H. J. Williams, builder—Highways, and Theatres and Music-halls; Mr. H. Ward, civil engineer—Main Drainage (*ex officio*) and Works (*ex officio*), as late vice-chairman.

INSTITUTION OF CIVIL ENGINEERS.—The engineering conference will be held in London on June 19-21, and the annual converszaione on June 20 at the Royal Albert Hall. For six of the seven sections the appointed Chairmen are :—I., Railways—Mr. W. R. Galbraith ; II., Harbours, Docks, and Canals—Sir W. Matthews, K.C.M.G.; III., Machinery—Mr. W. C. Unwin, F.R.S. ; V., Shipbuilding—Mr. F. Elgar, F.R.S. ; VI., Waterworks—Sir G. T. Livesey ; and VII., Application of Electricity—Mr. R. E. B. Crompton, C.B. The Chairman of section IV., Mining and Metallurgy, is not yet appointed.

WAR MEMORIAL, SOUTH AFRICA.—A memorial of the South African War, 1899-1902, will be erected in East London, South Africa. The monument, upon which Mr. Reynolds-Stephens is now engaged, embodies the design of a mounted Afrikander on scouting duty.

BRIGHTON MASTER BUILDERS' ASSOCIATION.—On the 18th inst. the fourteenth annual dinner of this Association was held at the Hotel Metropole, Brighton. The Mayors of Brighton and Hove were present, and the President of the Association, Alderman W. Botting, J.P., was in the chair. Mr. T. P. Harker proposed "The Corporations of Brighton and Hove." The Mayor of Brighton, who first replied, said that Brighton builders built too well. No house should be built to last more than twenty-five years. Tastes changed in a less period than that. A little while ago the ideal was a dignified edifice of many stories and a basement. Now people wanted red bricks and smaller houses with more modern comforts. Builders might do more than they did in the way of modernising existing houses. The Mayor of Hove also replied. "The Association of Master Builders" was given by Alderman Buckwell, who remarked that it was formed fifteen years ago for the mutual defence and support of the builders. Its existence had tended to bring into harmonious relations men who were often necessarily in competition in trade. They were fortunate, particularly in regard to their insurance fund, which had built up a reserve of 8,000*l*. Thanks to this reserve it would not be necessary to increase the premiums to cope with the larger liabilities imposed by the Act he had mentioned. The President acknowledged the toast. It was quite true, as the alderman had said, that the insurance fund was in a very strong position. It was founded in 1897 and gave to the members for 7s. 6d. the same security for which the big offices in London wanted to charge them 37s. 6d. The shares were 1*l*., but only 4s. was called up, and that 4s. was now worth 30s. The remaining toast of "The Visitors," was proposed by Councillor Wilson and responded to by Alderman Colbourne.

SHEFFIELD MASTER BUILDERS' ASSOCIATION.—The annual dinner of the Sheffield Master Builders' Association was held at the Building Trades' Exchange, Cross Burgess-street, on the 20th inst., under the chairmanship of the President, Mr. C. E. Powell. Mr. A. J. Forsdike, who submitted the toast of the city and trade of Sheffield, said that, although there had been some slackness in the building trade during recent years, there were prospects of improvement. There were similar prospects, too, in regard to the lighter trades. The Lord Mayor, in reply, referred to the close connexion of the Corporation and the master builders. When they thought of the enormous stretches of property which the Corporation had demolished for the purposes of street and other improvements they could not help feeling that they had proved to be the builders' best friend. On the question of by-laws the Lord Mayor urged that they should be adapted so as to meet local requirements rather than be applied in the rigid way that they were sometimes throughout the country. Alderman Nixon also responded. Mr. W. W. Mears proposed the toast of the Yorkshire Federation, which, he said, had altered entirely the conditions of the life of the builder. Mr. A. W. Sinclair (President of the Federation), in reply, said he had great hopes that in the Conciliation Boards which had been formed during the last two years there was a more excellent way than formerly existed of dealing with matters of dispute between employers and employees in the building trade. The aim was to be fair all round, and was in the direction of a greater recognition of the fact that the interests of employers and workmen were one. Mr. A. J. Forsdike also replied. Mr. J. Biggin gave the toast of the "Architects and Surveyors," and appealed to them for sympathy and support to builders in the increased responsibilities that would be brought about by the Workmen's Compensation Act, the Trades Disputes Act, and the projected law with regard to scaffolding. The relations existing between architects and surveyors and builders were of a more amicable character than formerly. Mr. Charles Flockton, Mr. J. R. Wigfull, and Councillor Fenton responded. Mr. Wigfull said he hoped that the American system of engaging sub-contractors to such a large extent would never be introduced in England. It was much better for the architect to come in direct contact with the master builder, who thoroughly understood his trade, and discuss matters with him. Councillor Fenton said he thought that the proposed new by-laws of the Sheffield Highways Committee were entirely unnecessary. The real object of by-laws was to prevent bad building, and not to restrict good building, and the Corporation ought to be extremely careful before they adopted by-laws which would have the effect of increasing the rents paid by working classes by about 5d. or 6d. a week. The toast of the Sheffield Association was submitted by Alderman W. Judge (Wakefield), the Chairman replying.

MUNICIPAL DWELLINGS FOR CHELSEA.—Earl Cadogan has made a gift to Chelsea Borough Council of half an acre of freehold ground in Manor-street for the erection of working-class dwellings. It is proposed to put up buildings at an estimated cost of 16,792*l*. The Public Health and Housing Committee of the Borough Council are to prepare a scheme, and for this purpose are to invite an architect or architects to submit designs drawings, and plans, with estimates of cost.

PROPOSED REBUILDING OF SOUTHWARK BRIDGE.—At the meeting of the Court of Common Council held on Thursday last week, a report was submitted by the Bridge-House Estates Committee upon the subject of improving or reconstructing Southwark Bridge. The Committee were authorised to take expert advice on the question.

SCOTTISH ECCLESIASTICAL SOCIETY.—At a meeting of this Society held on the 19th inst., in St. Oswald Halls, Glasgow, Mr. P. Macgregor Cualmers, F.S.A., read a paper on "Some Recent Researches in Kelso Abbey." When, he said, this Abbey was founded in 1128, a pure Norman style was in use, but the Norman characteristics of the work which is preserved are so largely mixed with details of a transitional type that the date cannot be earlier than about 1160. The upper part of the tower was built about 1200. Kelso ranks as the second longest church in Scotland, being only exceeded in length by the cathedral church of St. Andrews. The design of the west front of Kelso Abbey (of which so much happily remains, is the finest and most impressive in Scotland, worthy of its great founder and of its splendid history. Its source may be found in the great contemporary cathedral at Ely.

APPOINTMENT OF SANITARY OFFICERS.—The Local Government Board have sanctioned increases of salary of sanitary inspectors as follows:—Metropolitan Borough of Bethnal Green, Mr. J. G. Weeks ; Metropolitan Borough of Hampstead, Mr. W. G. Kershaw and Mr. F. H. Hudson ; Royal Borough of Kensington, Mr. J. H. Fowles.

PRESERVING MEDIÆVAL YORK.—Mr. Frank Green, of the Treasurer's House, York, has again placed archæologists and antiquaries under an obligation, in the rescue of an interesting bit of mediæval York, threatened with destruction. Three old shops in Pavement, the oldest street in the city, with two tiers of overhanging stories, and solers, of not later date than Edward the Third's reign were in danger of collapsing from the subsidence of the ground, and a natural desire has been expressed on all hands that they should be preserved. The increasing value of sites for business premises, and the great cost of putting the houses into proper repair, rendered the restoration of the places unprofitable. The preservation of the buildings on the original site being impossible, the owners, Messrs. Dove, gave Mr. Green the opportunity of purchasing them, and Mr. Green intends to remove them to a site close to the old Minster gateway, in the Cathedral precincts, where they will be re-erected in precisely the same condition as they formerly stood in Pavement. Mr. Green, who has largely interested himself in restoring the relics of the ancient city, is being advised in the matter by Mr. Temple Moore, of London. In Mr. Moore's opinion there will be no difficulty in re-erecting the houses, which are half-timbered and of "brick-noggin," and when the walls are stripped of their modern plaster and other accretions of the last two hundred years it is believed the skeleton will be found to be perfectly sound. One or two local historians think the buildings form the identical house in which the first Parliament of Henry II. met.—*Yorkshire Post.*

Legal.

CASE UNDER THE LONDON BUILDING ACT.

THE case of the London County Council *v.* Hancock & James came before a Divisional Court of King's Bench, composed of the Lord Chief Justice and Justices Darling and A. T. Lawrence, on the 25th inst., on the appeal of the London County Council from a decision of Mr. Plowden, the Metropolitan Stipendiary, under sect. 22 of the London Building Act, 1894.

Mr. Horace Avory, K.C., and Mr. Daldy appeared for the appellants ; the respondents were not represented by counsel.

Mr. Avory, in opening the case, said the question for decision was raised in the form of a special case, and was one which was often discussed in that Court, viz., as to what was a "structure" within the meaning of sect. 22 of the London Building Act, 1894, that section forbidding any building or structure beyond the general line of building without the consent in writing of the London County Council. The learned counsel then read the special case, which stated that on June 28, 1906, the respondents (a firm of Court milliners) appeared to answer an information laid on behalf of the London County Council which charged them with having unlawfully erected a structure in contravention of the provisions of Part III. of the London Building Act, 1894, beyond the general line of buildings of Grafton-street without the consent in writing of the London County Council, whereby the respondents became liable to a penalty prescribed by sect. 200, subsect. 3, of the Act of 1894, as amended by the London Building Act Amendment Act, 1898. At the hearing before the magistrate the following facts were proved or admitted :—(1) The respondents carried on business at No. 8, Grafton-street, W. The front main wall of No. 8 stood back about 7 ft. from the public way. The front door was in the front main wall and was approached from the public footway by a flight of four stone steps and a stone landing at the top of the steps. (2) At the time laid in the information the respondents (the defendants), without the consent of the Council, erected upon the steps and landing before referred to a large show-case of wood and glass having the following dimensions :—Length, 7 ft. 6 in. ; width, 1 ft. 10 in. ; height above the street level, 9 ft. 3 in. The show-case, according to the evidence, took the place of a shop-front. (3) The general line of buildings in Grafton-street, in which the premises were situated, was determined by a certificate of the superintending architect, dated June 11, 1906, and the show-case projected 6 ft. 3 in. beyond such general line of buildings. (4) The show-case stood upon the defendants' property. The houses in that part of Grafton-street had bay windows in front of the general line of buildings, and the said show-case was slightly in front of the bays. The London County Council contended that the show-case was a "structure" within the meaning of sect. 22 of the Act of 1894, but the respondents contended to the contrary. Mr. Plowden was of opinion, on the authority of the decision in the case of London County Council *v.* The Illuminated Advertisements Company, that, so far as it was a question of fact for him to decide, the show-case did not amount to the erection of a structure within the meaning of sect. 22, and he dismissed the information. The question for the Court was whether the magistrate was right in so holding. Sect. 22 of the Act provides :—"No building or structure shall without the consent in writing of the Council be erected beyond the general line of buildings in any street or part of a street, place, or row of houses in which the same is situate, in case the distance of such line of buildings from the highway does not exceed 50 ft., notwithstanding there being gardens or vacant spaces between the line of buildings and the highway. Such general line of buildings shall, if required, be defined by the superintending architect by a certificate, such certificate to be issued within one month from the date of the application therefor."

Mr. Justice Darling asked if the green line on the plan showed the general line of buildings ?

Mr. Avory said that it did.

Mr. Justice Darling : Then all the bay windows are beyond the general line of buildings ?

Mr. Avory : Yes.

Mr. Justice Darling : Then why do you not make them pull them down ?

The learned counsel said that the bay windows in the street had not been erected since the building line was established. If the superintending architect was called upon to define the general line of buildings in a street he might if he liked, if the houses had bay windows, define the front of the bay windows as the building line, or he might define the front wall of the houses as the building line. If he did that he could not summon people who had bay windows in front of the building line.

Mr. Justice Darling : What is the real grievance here?

Mr. Avory : That it projects beyond the general line of buildings.

Mr. Justice Darling : So does the bay window. What harm does the show-case do ? What does it obstruct?

Mr. Avory replied that his submission was that the show-case came within the definition of "structure" in sect. 22 of the Act, as it took the place of a shop-front.

The Lord Chief Justice thought it would be rather a straining of language to say that the show-case was part of the shop-front or formed part of the building. It could be carried in and out every day if it was wished.

Mr. Avory replied that so could the front of a

shop. The evidence was that the show-case took the place of a shop-front, and even if it was not part of the building he submitted it was clearly a "structure" within the meaning of the section. He cited the case of The Coburg Hotel *v.* The London County Council, in which it was held that a portico or canopy fixed to a porch over the pavement was a structure within the meaning of sect. 22.

Mr. Justice Darling: What happened about that? We decided it was a structure, and it is still there.

Mr. Avory: Yes, my lord, and so is the report. If this thing is held to be lawful, perhaps everybody in Bond-street will be extending their shop fronts over the pavement.

In conclusion, the learned counsel contended that the show-case came within the terms of sect. 22, and that it was clearly in the nature of a shop-front, and came within the section.

The Lord Chief Justice, in giving judgment, said there was no statement that the show-case in question was a shop-front. It was said in the special case that the show-case took the place of a shop-front; that was that ladies' blouses, collars, cuffs, ties, and things ordinarily placed in a shop-front would be put into it. He was unable to add anything to what he said in the case of London County Council *v.* Illuminated Advertisements Company, and he thought the view he expressed in that case was right. He thought the statute they were dealing with was a building statute, and he did not think it was intended that sect. 22 should apply to a show-case where it was not fastened to a building. He would have said the same about a show-case which was fastened to a building were it not for the case of Hull *v.* London County Council, under which it might be held to be a projection. He was of opinion that the learned magistrate had decided rightly in following the rule laid down by that Court in the case of London County Council *v.* Illuminated Advertisements Company, and he thought that the appeal should be dismissed.

Mr. Justice Darling concurred. If it had not been for the decision in the case of London County Council *v.* Illuminated Advertisements Company he would have felt bound to say that in his view the show-case was a structure. He was glad, however, that he was bound by that decision, because he looked upon this as a most frivolous prosecution. The statute of 1894 was to prevent the erection of structures or buildings in streets beyond the general line of buildings. In Grafton-street, where the show-case was, there were a number of bay windows in the street. The superintending architect might perfectly well have said that the general line of buildings was to be taken beyond the bay windows, and if that had been done the show-case would not have projected beyond the front of these windows. The show-case came no nearer the footpath than the bay windows, and in no sense was it a projection. No one could possibly say that it did any harm, except that it was in front of the theoretical general line of buildings as fixed by the surveyor. If the show-case had been a "structure" the magistrate was not bound to order its demolition; and probably that would have happened which happened in the Coburg Hotel case, in which the canopy in question was decided to be a "structure," but, nevertheless, it was still standing at the present day.

Mr. Justice A. T. Lawrence also concurred.

Mr. Avory said he was told that after the decision in the Coburg Hotel case the owners of the building applied for and obtained the formal consent of the London County Council to the canopy remaining. He did not want it to be thought that there had been any contempt of court.

Mr. Justice Darling: Then in the case of the Coburg Hotel it was merely a breach of etiquette.

APPEAL BY A BUILDING-OWNER.

IN the Court of Appeal, before the Master of the Rolls and Lords Justices Vaughan Williams and Buckley, on the 22nd inst., the case of the King *v.* The Local Government Board (*ex parte* J. H. Street) was heard on the appeal of Mr. Street from a judgment of a Divisional Court of King's Bench, consisting of the Lord Chief Justice and Mr. Justice Darling.

Mr. Foote, K.C., and Mr. Emanuel appeared for the appellant; the Attorney-General and Mr. Rowlatt for the Crown; and Mr. Macmorran, K.C., and Mr. Charles for the Corporation of Portsmouth.

Mr. Foote said in this case he appeared for Mr. Street, who appealed against a decision of the Divisional Court discharging a rule for a mandamus to the Local Government Board. The point was a short one, and arose on the construction of a local Act of Parliament—the Portsmouth Corporation Act—which was in the nature of a Public Health Act for the borough. The claim of the appellant was that the Local Government Board should entertain and hear a certain appeal brought by him against the determination of the Corporation. He was the owner of a building estate at Portsmouth, and the Corporation had the power to determine the levels in all the streets on a new estate, and he had been informed that the power, owing to the low level of Portsmouth and its proximity to the sea, would possibly be exercised so as to prevent that building estate being utilised at all. The appellant said he had a right to have the matter determined by the Local Government Board. The words in the Portsmouth Act were: —"Every street shall be laid down or formed at such level as the Corporation shall determine or approve," approve, of course, meant in the case of plans submitted by the building-owner, and determination meant the conclusion they formed on the point. The Act provided that notice of the determination of the Corporation should be given to persons interested or aggrieved, and it was not in dispute that the appellant was a person interested. The Act also provided that "any person deeming himself aggrieved by any order, determination, or decision of the Corporation may appeal to the next quarter sessions for the borough" the same way as an appeal under the Public Health Act of 1875. Appellant might have done that, and it was suggested in the Divisional Court that that was the proper course. He, however, suggested that the Recorder of the borough was hardly the proper person to decide such a point. The proper person would be an engineer sent down by the Local Government Board. The provision of the Act went on, "or he may appeal to the Local Government Board under sect. 268 of the Public Health Act, 1875." That, he contended, gave the appellant an appeal to the Local Government Board. That was the whole of the appellant's case, but the Crown contended that it was only intended to give an appeal in a case where any person felt himself aggrieved by the determination of any authority in any case in which the local authority were empowered to recover in a summary manner any expense incurred by them, or where such expense had been declared a private improvement expense.

Counsel proceeded to argue in support of his contention on the construction of the Act that the appeal was given in all cases to the Local Government Board.

The Attorney-General said the Local Government Board resisted the mandamus because it would cast on them the burden which, they held, was not intended by the statute, but they did not take the point that a mandamus would not issue against them. As servants of the Crown they desired that point should be determined, and they would argue it without raising the point. His learned friend had wandered over Acts of Parliament without placing before the Court the definite object of the Portsmouth Act. Under that Act extensive powers of local government were given, and the people aggrieved might appeal to quarter sessions, a right which was not enjoyed by boroughs under the Public Health Act. But it was felt that Portsmouth should have the same right to appeal to the Local Government Board in the same class of cases and under the same circumstances in which boroughs who had no special statute might exercise the right of appeal. It was never intended to create and throw on the Local Government Board in regard to their borough an obligation they had not to discharge in regard to other boroughs.

Mr. Macmorran, for the Portsmouth Corporation, contended that the appeal to the Local Government Board applied only to a strictly limited class of cases, and did not apply to the case before the Court.

Mr. Emanuel having replied, their lordships reserved judgment.

STAINES DRAINAGE DISPUTE.

THE case of the Attorney-General at the relation of the Staines Urban District Council *v.* Ashby came before Mr. Justice Joyce, sitting as an additional Judge of the King's Bench Division, last week.

This was an action by the plaintiffs against the defendant, Mr. John Ashby, of the Close, Staines, for an injunction to restrain him from constructing a manhole and siphon-trap forming part of the drains of his premises in High-street, Staines, upon in or under the footway forming part of the High-street in front of the said premises, and from in any way interfering with or removing the pavement for the said purpose.

It appeared that by-law No. 74 of the local authority provided that every person who should erect a new building should provide within the curtilage thereof in every main drain or other drain of such building which might directly communicate with any sewer or other means of drainage into which such drain might lawfully empty, a suitable trap at a point as distant as might be practicable from such building, and as near as might be practicable to the point at which such drain might be connected with such sewer or other means of drainage. Part 3 of the Public Health Act Amendment Act, 1890, had been duly adopted by the Council, and came into operation in 1891. The Council had duly made regulations under section 21 of the Public Health Act, 1875, in respect of the mode in which communications between drains and sewers were to be made, and had appointed an inspector to see these conditions duly carried out. In June, 1905, defendant gave notice that he intended to lay new drains at the premises in question, and agreed to abide by and conform to the regulations in respect thereof. Various plans were submitted to the Council but were rejected on the ground that they did not comply with the by-laws and did not comply with sect. 21 of the Public Health Act, 1875, and further, that they were based upon the proposed construction and use by the defendant of a private manhole or inspection chamber and intercepting trap in the highway opposite the premises, which construction and use would constitute an unlawful interference with the highway and an unlawful interruption of the traffic passing over and along the same. The Council said that the new drains could have been lawfully laid down by the defendant and connected with the sewer in other ways than those shown on the plans. On November 29, 1905, the defendant gave notice that he should carry out the work in accordance with his last deposited plan, and the plaintiffs accordingly instituted the present proceedings.

Defendant by his defence denied that the Council had made regulations under sect. 21 of the Public Health Act, 1875, in respect of the mode in which the communications between drains and sewers were to be made. He said that the by-laws in question related to the internal drainage of houses and solely to buildings erected subsequent to September 23, 1903, defendant's premises having been erected many years prior to September, 1903. Defendant further said that he gave notice of his re-drainage as he was always willing to comply with the regulations of the Council in respect of the mode in which communications between such drains and such sewers should be made. Defendant by notice requested the Council to make the necessary intercepting-trap and inspection chamber, and said he would pay the costs of such work. As the Council did not comply with the request defendant gave notice that he would do the work himself. Defendant denied that the manhole would be unlawful or would constitute a nuisance to the highway or traffic. Defendant also claimed to be the owner of the soil of the highway as far as the centre of the road in front of his premises, and claimed that in carrying out the proposed work he would be only exercising his lawful rights.

Mr. Danckwerts, K.C., and Mr. Palmer, appeared for the plaintiffs; and Mr. Macmorran, K.C., and Mr. Cunningham Glen, for the defendants.

The further hearing of the case was adjourned *sine die* owing to the illness of Mr. Danckwerts.

TRESPASSING ON A PRIVATE ROAD.

THE case of the Mayor, Aldermen and Citizens of Bradford *v.* Lindsay and Hawkin came before Mr. Justice Swinfen-Eady, in the Chancery Division, on the 22nd inst., on a motion by the plaintiffs to restrain the defendants from trespassing upon the plaintiffs' private road which led from Lofthouse to their reservoir at Angram in the Nidd Valley, Yorkshire.

It appeared that the road in question was laid out by the plaintiffs for the purpose of affording access to the reservoirs which were in course of construction, as also a line of rails occupying a part of the road for the conveyance of materials to the works from a light railway in the neighbourhood running from Patchy Bridge to Lofthouse, and which was owned by the plaintiffs. Several of the workmen employed at the works lived at Angram, and the plaintiffs had erected buildings which had been rented as stores for the purpose of supplying provisions, etc, by the contractors, who were also co-plaintiffs. The defendants were grocers at Patchy Bridge, and they alleged that in using the road in question they had done no damage, and that as the road was of a temporary character, only intended to last during the construction of the reservoirs, there could be no question raised as to their gaining rights adverse to the plaintiffs by using it. Defendants also said that the plaintiffs' object in bringing the action was not to protect their right, but to prevent tradesmen from competing with the stores of their contractors. The plaintiffs replied that their object in closing the road was to avoid the responsibility which would be caused if the road were opened to wheeled traffic in consequence of the line of railway thereon.

In the result his lordship held that defendants had no legal right to use the road, and granted a perpetual injunction against the defendants in the terms asked.

Order accordingly.

Mr. Eve, K.C., and Mr. Underhill, appeared for the plaintiffs; and Mr. F. H. Maugham for the defendants.

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competition, —; Contracts, iv. vi. viii. x.; Public Appointments, xix.; Auction Sales, xxviii.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the date when the tender, or the names of those willing to submit tenders, should be sent in.

***** It must be understood that the following paragraphs are printed as news, and not as advertisements: and that while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur.**

Contracts.

BUILDING.

MARCH 30.—**Dublin.**—ADDITIONS TO LIBRARY.—Corporation of Dublin invite tenders for proposed additions to the Public Library at Charleville Mall, in accordance with plans, etc., prepared by the City Architect, which may be inspected at his office, Municipal-buildings, Cork Hill, Dublin, between the hours of 11 a.m. and 4 p.m. Copies of bills of quantities, etc., may be obtained at the office of the City Treasurer, Municipal-buildings, Cork Hill, Dublin, on payment of 2*l*. Tenders, addressed to "The Chairman of the Public Libraries Committee."

APRIL 1.—**Belhelvie.**—FARMHOUSE.—Estimates wanted for mason, carpenter, slater, and plaster works of new farm house at Middleton, Belhelvie (Mr. William Wilson, tenant). Plan and specifications may be seen with Messrs. Watt & Davidson, C.E. and architects, 216, Union-street, Aberdeen.

APRIL 1.—**Feltwell Fen.**—BARN.—The erection of a barn for the Moundeford Charity Commissioners. Plans, etc., can be seen at the offices of Messrs. Charles Hawkins & Son, Downham Market.

APRIL 1.—**Pluscarden.**—HOUSE.—The mason, carpenter, plumber, slater, and plaster works of new house, to be erected at Easter Fosterseat, Pluscarden. The plans and specifications may be seen with Mr. John Wittet, architect, Elgin.

APRIL 1.—**Sandbach.**—SLAUGHTER-HOUSE.—Sandbach Industrial Co-operative Society, Ltd., invite tenders for the erection of proposed slaughter-house at Sandbach. Plans, etc., may be inspected on application to Mr. Wm. Gibson, manager, at the Society's Offices, Bold-street, Sandbach. Bills of quantities can be had from Alfred Price & Son, architects, Elworth, Sandbach, on payment of 10s. 6d.

APRIL 2.—**Ballyhaunis.**—CEILING.—Estimates are requested for ceiling in timber of new Church of St. Patrick's, Ballyhaunis, for the Very Rev. Canon Canning, P.P. The plans, etc., can be seen at the church by applying to Mr. J. C. Fitzmaurice, contractor, Ballyhaunis, or at office of William H. Byrne & Son, architects, 20, Suffolk-street, Dublin.

APRIL 3.—**Aberbargoed.**—WORKMEN'S INSTITUTE.—Tenders are invited for the erection of a new workmen's institute, situate in Commercial-street, Aberbargoed. Plans, etc., may be seen at the offices of the architects, Messrs. James & Morgan, FF.R.I.B.A., Charles-street-chambers, Cardiff, from whom bills of quantities may be obtained upon payment of a deposit of 2*l*. 2s.

APRIL 3.—**Monymusk.**—SCHOOL.—For mason, carpenter, slater, plaster, plumber, heating, and painter and glazier works of new public shool to be erected at Monymusk village. Plans seen and schedules of quantities obtained from Mr. John Buchan, Monymusk (who will point out site), or with the architect, Mr. William E. Gauld, A.R.I.B.A., 258, Union-street, Aberdeen.

APRIL 3.—**Ormskirk.**—WORKHOUSE PAVILION, ETC.—The erection of a new pavilion and the extension of main infirmary block at the Ormskirk Workhouse. Plans, etc., may be seen, and quantities obtained, on application to Mr. J. Dod, architect, D16, Exchange-buildings, Liverpool.

APRIL 3.—**Rathdown.**—COTTAGES.—Rathdown No. 1 R.D.C. invite tenders for building two single labourers' cottages and six double labourers' cottages in the Glencullen Electoral Division, at a cost not exceeding 154*l*. 10s. each. Plans and specifications and tender forms for the works can be obtained from the Clerk to the R.D.C., on payment of 5s.

APRIL 3.—**Stockport.**—SCHOOLS.—County Borough of Stockport Education Committee invite tenders for the whole of the works required in the erection of Newbridge-lane new schools. Names, together with a deposit of 3*l*. 3s., to Mr. Arthur Lawton, Secretary to Education Committee, Education Offices.

APRIL 4.—**Hasland.**—SCHOOL.—The Derbyshire Education Committee invite tenders for the erection of Hasland Council School, to accommodate 320 children. Persons desirous of tendering may see the drawings, etc., at the office of the Architect to the Committee, St. Mary's Gate, Derby. A copy of the bill of quantities, etc., can be obtained at the Architect's Office upon payment of 1*l*. 1s.

APRIL 4.—**Skinningrove.**—SCHOOL WORKS.—North Riding of Yorkshire County Council Education Committee invite tenders for the whole of the several works in connexion with the alterations and additions at the Skinningrove Council School:—(*a*) Infants' department; (*b*) mixed department. Plans, etc., to be seen at the school in each case during ordinary school hours.

APRIL 4.—**Treharris.**—PARISH HALL.—The erection of Parish Hall at Treharris. Plans, etc., may be seen at the office of Mr. William Dowdeswell, architect, Treharris.

APRIL 5.—**Armagh.**—CORRIDORS.—The Committee of the Armagh Asylum invite tenders for alterations to corridors, male side, main building. Plans and specifications may be seen at office of Mr. R. H. Dorman, County Surveyor, Armagh.

APRIL 5.—**Harrogate.**—RESIDENCE.—Erecting detached villa residence on the St. James's Park Estate, Harrogate. Plans and specifications will lie for inspection, and bills of quantities may be obtained, at offices of Mr. W. Clement Williams, architect, 29, Southgate, Halifax.

APRIL 5.—**Stapleton, Bristol.**—MORTUARY.—Bristol Guardians invite tenders for the erection of a mortuary at the Stapleton Workhouse, in accordance with drawings, etc., which are deposited for inspection at office of Mr. J. J. Simpson, Clerk to the Guardians, St. Peter's Hospital, Bristol.

APRIL 6.—**Truro.**—WAREHOUSE.—The erection of a new warehouse at Lemon Quay, Truro. Plans, etc., may be seen at the offices of Messrs. John Julian & Co., Lemon-street, Truro.

APRIL 8.—**Leavening.**—SCHOOL.—The Education Committee of the East Riding of the County of York invite tenders for the erection of a Council School for 100 children at Leavening. Plans, etc., may be seen, and form of tender obtained, on application to the Building Surveyor, County Hall, Beverley, or at the School House during the usual hours.

APRIL 8.—**Lossiemouth.**—BATHS.—Mason, carpenter, plumber, slater, plaster, and painter work in reconstructing the Lossiemouth Baths. Plans, etc., to be seen with Mr. R. B. Pratt, architect, Town and County Bank-buildings, Elgin.

APRIL 8.—**Oldham.**—SCHOOL.—Oldham Education Committee invite tenders for the whole or any portion of the work required in the erection of new Council Infants' School in Richmond-street. Plans, etc., may be seen, and bills of quantities obtained, upon application to the architect, Mr. Thomas Hilton, 7, Union-street, Oldham.

APRIL 9.—**Cockton Hill.**—SCHOOL.—Durham County Education Authority invite tenders for new Council School at Cockton Hill. Plans, etc., can be seen, and bills of quantities obtained, at the office of the County Education Committee's Architect, Shire Hall, Durham.

APRIL 9.—**South Church.**—SCHOOL WORKS.—Durham County Education Authority invite tenders for alterations to the South Church Council School. Plans, etc., may be seen at the School, or at the office of the Education Committee's Architect, Shire Hall, Durham, and bills of quantities may be obtained upon application to the Clerk to the Education Committee, Shire Hall, Durham.

APRIL 10.—**Uckfield.**—ALTERATIONS TO PUBLIC HALL.—The Uckfield Public Hall Company, Ltd., Directors invite tenders for certain alterations and additions to the Public Hall, Uckfield. Plans and specification can be seen by application to Messrs. Overton & Scott, architects and surveyors, the Public Hall, Uckfield.

APRIL 11.—**Bedale.**—RESTORATION OF CHURCH.—For restoration to Bedale Church, Yorkshire. Plans, etc., on application at the Rectory. Quantities may be obtained on application to Mr. G. R. Boreham, quantity surveyor, 24, John-street, Sunderland.

* APRIL 12.—**New Barnet.**—TELEPHONE EXCHANGE.—The Commissioners of H.M. Works, etc., invite tenders for erection of a telephone exchange at New Barnet. Drawings, specifications, and a copy of conditions, etc., may be seen on application to Mr. J. Rutherford, H.M. Office of Works, Storey's Gate, S.W., and bills of quantities from the Secretary, as above. Tenders addressed to the Secretary, H.M. Office of Works, Storey's Gate, S.W., and endorsed "Tender for New Barnet Telephone Exchange," to be delivered before 12 noon on April 12.

APRIL 12.—**Pocklington.**—SCHOOL.—The Education Committee of the East Riding of the County of York invite tenders for the erection of a Council School to accommodate 250 children, at Pocklington. Plans, etc., may be seen, and forms of tender and copies of quantities obtained, on application to the Building Surveyor, County Hall, Beverley, upon depositing 1*l*. 1s. A copy of the plan and specification can also be seen at the Police Station, Pocklington.

* MAY 1.—**Dorset.**—ALMSHOUSES.—Tenders are invited for erection of almshouses, boundary walls, and fences, etc., at Wareham, Dorset. Plans and specifications may be seen at the architect's office, Mr. J. Andrew Minty, 35, Craven-street, W.C., from April 3 to 10. Tenders in writing to be sent to Mr. G. Claven Fuliter, North-street, Ware, Dorset, not later than May 1.

MAY 1.—**Wareham.**—ALMSHOUSES.—The Trustees of Streche's Almshouse Charity, Wareham, Dorset, invite tenders for the erection of almshouses, boundary walls, and fences, etc., at Wareham, Dorset. Plans, etc., may be inspected at the office of Mr. G. Clavell Filliter, North-street, Wareham, Dorset, between March 25 and April 3. Applications, accompanied by a deposit of 3*l*., to be made to Mr. Filliter.

NO DATE.—**Birmingham.**—REPAIRS, ETC.—Birmingham Municipal School of Art Committee invite tenders for cleaning and repairs at the Central School, Vittoria-street School for Jewellers and Silversmiths, and Moseley-road Branch School. Specifications and forms of tender may be obtained on application to Mr. E. Preston Hytch, Secretary, Municipal School of Art, Birmingham.

NO DATE.—**Blyth.**—ALTERATIONS TO CHURCH.—Alterations and additions to Primitive Methodist Church, Cowpen Quay, Blyth. Names to Mr. T. E. Davidson & Son, architects, Pearl-buildings, Newcastle-on-Tyne.

NO DATE.—**Guildford.**—RETAINING WALL.—The erection of two small retaining walls on Poyle Charity Estate, Guildford, at Charlotteville. Apply to Mr. William G. Lower, of No. 12A, High-street, Guildford, the Surveyor to the Trustees.

NO DATE.—**Hayton.**—ADDITIONS, ETC.—Additions and alterations at Claremont and The Poplars, Hayton, for Mr. M. S. Leishman. Names to Messrs. S. W. B. & D. H. Jack, architects and surveyors, 19, Lowther-street, Carlisle.

NO DATE.—**Hesket-in-the-Forest.**—RESEATING.—For reseating, etc., St. Mary's Church, Hesket-in-the Forest. Names to Messrs. Oliver & Dodgshun, F.F.R.I.B.A., architects, Carlisle, stating the trades for which they desire to tender.

NO DATE.—**Hessle.**—COTTAGES.—A pair of semi-detached cottages, Hessle. Messrs. Freeman, Son, & Gaskell, architects, 11, Carr-lane, Hull.

NO DATE.—**Inverness.**—MOTOR-CAR GARAGE.—The mason, iron, concrete floor, carpenter, plumber, and painter and glazier works of motor-car garage, proposed to be erected by Messrs. Macrae & Dick, Inverness. Names with Messrs. Cameron & Burnett, architects and ordained surveyors, Academy-buildings, Inverness.

NO DATE.—**Manchester.**—MILL CHIMNEY.—For the erection of a new mill chimney and the pulling down of an old one. Apply to Messrs. T. Cook & Sons, architects, Hodson's-court, Corporation-street, Manchester.

NO DATE.—**Newport.**—BUSINESS PREMISES.—The erection of business premises, High-street, Newport, for Dr. A. Garrod Thomas, D.L., J.P. Plans may been seen, and bills of quantities obtained, upon application and payment to Mr. Alfred Swash, F.R.I.B.A., architect, Midland Bank-chambers, Newport, of 2*l*. 2s.

NO DATE.—**Taunton.**—COTTAGE, ETC.—Taunton T.C. invite tenders for the following works:—(1) Widening of Kingston-road, from St. Andrew's-road to Cheddon-road; (2) erection of cottage over and in the rear of the Fire Brigade Station, Magdalene-street; (3) relaying floor in retiring-room of Municipal Hall. Plans, etc., may be seen, and forms of tenders and quantities obtained, on application to Mr. David Edwards, A.M.Inst.C.E., Borough Surveyor, Municipal-buildings.

ENGINEERING, IRON, AND STEEL.

APRIL 1.—**Kinghorn.**—STEEL TANK, ETC.—The Directors of Kinghorn Gas Light Company, Ltd., invite tenders for supplying and erecting in Kinghorn a steel tank and gas-holder complete, size about 40 by 14. Particulars to be had from the Manager at Gas Works.

APRIL 4.—**Crumpsall.**—STEAM ENGINE.—Prestwich Guardians invite tenders for the supply and erection of a new steam engine to drive the laundry machinery at their Workhouse, Delaunay's-road, Crumpsall. Further particulars may be obtained on application to the Workhouse Master, Mr W. T. Jones.

APRIL 5.—**Croydon.**—GAS-ENGINES.—Croydon Corporation invite tenders for the supply and erection of two gas-engines and pumps for pumping sewage sludge in connexion with the new works of sewage disposal, Beddington. Spesification, etc., may be obtained on application at the office of the Borough Engineer, Town Hall, Croydon, upon payment of a deposit of 1*l*. 1s.

APRIL 8.—**Axbridge.**—BLAGDON WATER SUPPLY.—Axbridge U.R.D.C. invite tenders for supplying about 250 tons of cast-iron socket water pipes, 6 in. to 2 in. in diameter. Specifications, etc., may be obtained from the engineer, Mr. A. Powell, M.Inst.C.E., 10, Orchard-street, College Green, Bristol.

APRIL 10.—**Tutbury.**—BRANSTONE CANAL BRIDGE.—Tutbury R.D.C. invite tenders for the reconstruction of Branstone Canal Bridge. Plans and specification may be seen on application to Mr. H. S. Tebbitt, surveyor, Rolleston-on-Dove, and from whom forms of tender can be obtained.

APRIL 16.—**London.**—BOLTS, NUTS, ETC.—Bombay, Baroda, and Central India Railway Company Directors invite tenders for the supply of the following stores, viz.:—(1) Wrought-iron and mild steel bolts, nuts, rivets, etc.; (2) miscellaneous tools and stores. Tenders must be made on forms, copies of which, with specifications, can be obtained at offices of Mr. W. V. Constable, Secretary, offices, Gloucester House, 2, 3, and 4, Bishopsgate-street Without, London, E.C., on payment of 21s. each (which will not be returned).

APRIL 17.—**Carlton.**—RECONSTRUCTION OF BRIDGE.—The West Riding C.C. invite tenders for the reconstruction of the 75 ft. span masonry bridge known as Carlton Bridge, carrying a district road over the River Aire, at Carlton. Plans may be seen, and general conditions, etc., obtained, at the office of Mr. F. G. Carpenter, West Riding Surveyor, County Hall, Wakefield. A deposit of 1*l*. will be required. Cheques, etc., must be made payable to the West Riding Treasurer, and sent direct to him at the County Hall, Wakefield.

APRIL 19.—**London.**—FOOTBRIDGE.—West London Extension Railway Directors invite tenders for the reconstruction of the footbridge at Chelsea Station. Plans may be seen, and forms of tender and bills of quantities obtained, at the office of the Engineer at the Paddington (Great Western) Station.

APRIL 23.—**London.**—WROUGHT-IRON PIPING.—The Crown Agents for the Colonies, acting on behalf of the Administration of the Central South African Railways, invite tenders for the supply of 90,000ft. galvanised wrought-iron piping. Forms of tenders and all particulars may be obtained on application at the office of the Crown Agents for the Colonies, Whitehall-gardens, London, S.W.

APRIL 24.—**Handsworth.**—ELECTRIC LIGHT: PIPE-WORK.—The U.D.C. of Handsworth invite tenders for the supply, delivery, and erection of the following at their Electric Power Station. Contract No. 18.—Extension pipework. Copies of the specification, with the conditions of contract, etc., can be obtained from Mr. H. Ward, Clerk, the Council House, Handsworth, near Birmingham, on payment of a sum of 3*l.* 3s. The specification, etc., can be seen at (but not obtained from) the offices of the consulting engineers, Messrs. Kennedy & Jenkin, 17, Victoria-street, Westminster, London, S.W.

MISCELLANEOUS.

* APRIL 5.—**Portsmouth.**—FOUNDATION, ETC.—Tenders are invited for work in foundations, brickwork, floors, drainage, water and gas supplies, and certain fittings to new stables, harness rooms, forage stores, litter sheds, etc., at forts Fareham and Nelson, Portsdown Hill, Portsmouth. Plans, specifications, and conditions of contract may be inspected at War Office, 80, Pall Mall, S.W., on April 3 to 5.

APRIL 6.—**Bredwardine.**—HAULING.—Bredwardine R.D.C. invite tenders for hauling materials for the roads in their district. Forms and particulars can be obtained from the Surveyor, Mr. H. B. Hamar, Bucklands, Hay.

* APRIL 9.—**Bromley.**—GRANOLITHIC PAVING.—Tenders are invited for granolithic paving, at the Sick Asylum, Devon's-road, Bromley-by-Bow. Form of tender, etc., may be obtained on application to the Engineer and Superintendent of Labour, at the Asylum, between 10 a.m. and 1 p.m. Sealed tenders to be delivered to the Clerk's office, Devon's-road, Bromley-by-Bow, E.

APRIL 9.—**Mountain Ash.**—TEAM LABOUR.—Mountain Ash U.D.C. invite tenders for the team work required to be done in the Ynysybwl Ward. Specification may be seen, and form of tender obtained, on application to the Surveyor to the Council, Town Hall, Mountain Ash.

APRIL 10.—**Brighton.**—SEATS.—Brighton Corporation invite tenders from local firms for the supply of six seats with glass wind screens. The plans may be seen, and specification and form of tender obtained, on application at the office of the Borough Surveyor at the Town Hall, Brighton.

APRIL 10.—**Stoke-upon-Trent.**—SCAVENGING.—The R.D.C. invite tenders for the removal, during a period of three years, of ashes and house refuse, and of nightsoil, contents of cesspools, and other similar matters, in accordance with the specification to be seen on application to Mr. Gilbert McHarg, Inspector of Nuisances, Bucknall, or at the Union Offices, Stoke-upon-Trent.

APRIL 12.—**Newton Abbot.**—FIRE BRIGADE CALLS.—Newton Abbot U.D.C. invite tenders for providing wires, fixings, bells, and instruments for the fire brigade calls. Plans, etc., can be seen at the office of the Surveyor, Mr. Lewis Stevens, Town Hall, Newton Abbot, from whom further particulars may be obtained, and bill of quantities can be had on payment of 1*l.*

* APRIL 18.—**Hackney.**—ELECTRICITY WORKS.—The Hackney B.C. invite tenders for work at the Electricity Works, comprising engine foundations and builders' work. Drawings may be seen at the Engineer's office, 64, Victoria-street, S.W., and conditions obtained from the Town Clerk's office, Town Hall, Mare-street, Hackney, on and after April 3. Tender to be delivered in person, endorsed "Tender for Engine Foundations," at the Town Hall, at 7 p.m., on April 18.

APRIL 30.—**Cheltenham.**—ROAD ROLLER.—Tenders invited for a petrol or steam road-roller designed especially for rolling small patches of macadamised roads. Tenders to be delivered by April 30 1907. For further particulars apply to Mr. J. S. Pickering, Borough Surveyor, Cheltenham.

PAINTING, etc.

APRIL 2.—**Ballyhaunis.**—PLASTERING.—Estimates are required for the internal plastering of the new church of St. Patrick, Ballyhaunis, for the Very Rev. Canon Canning, P.P. The plans, etc., can be seen at the church by applying to Mr. J. C. Fitzmaurice, contractor, Ballyhaunis, or at office of Messrs. W. H. Byrne & Son, architects, 20, Suffolk-street, Dublin.

APRIL 2.—**Ramsgate.**—PAINTING.—Ramsgate Corporation invite tenders for painting and other works at Albion House. Specification can be seen, and full particulars obtained, on application at the Borough Engineer's Office, Albion House.

APRIL 2.—**Ramsgate.**—PAINTING.—Ramsgate Corporation invite tenders for painting and other works at the Town Hall. Specification can be seen, and full particulars obtained, on application at the Borough Engineer's Office, Albion House.

APRIL 4.—**Sheffield.**—PAINTING.—The Directors of the Midland Railway Company invite tenders for painting, etc., to Goods Offices at Wicker and Eyre-street, Sheffield. Specification may be seen, quantities, etc., obtained, on application, at the Engineer's Office, Derby.

APRIL 5.—**Pendleton.**—PAINTING.—Salford Guardians invite tenders for painting, etc., required at the Nurses' Home, Eccles Old-road, Pendleton. Specification, etc., may be obtained from the Steward at the Infirmary.

APRIL 8.—**Stanwix.**—PAINTING.—Stanwix Burial Board invite tenders for outside painting at Stanwix Cemetery. Specifications may be seen, and the work pointed out, on application to the Curator. Tenders to be delivered to Mr. Wm. Dobinson, Clerk of the Board, 10, Bank-street, Carlisle.

APRIL 9.—**Winchester.**—PAINTING.—Winchester Corporation invite tenders for painting work at the Victoria Isolation Hospital. Full particulars can be obtained on application at the City Surveyor's Office.

* APRIL 17.—**Fulham.**—HOSPITAL.—The M.A.B. invite tenders for external and internal cleaning and painting at the Western Fever Hospital, Seagrove-road, Fulham, S.W., in accordance with specification prepared by the Engineer-in-Chief. Specification, conditions of contract, bill of quantities, and form of tender, may be inspected at the Board's Office, Embankment, E.C., on and after March 22. Tenders, addressed as noted, on form, to be delivered at the Board's Office, not later than 10 a.m. on April 17.

ROADS, SANITARY, AND WATER WORKS.

APRIL 3.—**Audenshaw.**—MAKING-UP.—The U.D.C. of Audenshaw invite tenders for making up the private streets known as Williamson-lane, Fitzroy-street, and Rutland-street. Plans may be seen, and forms of tender obtained, on application to Mr. William Clough, Engineer and Surveyor to the Council, Council Offices, 2, Guide-lane, Audenshaw, on payment of 1*l.* 1s.

APRIL 3.—**Clydebank.**—RESERVOIR.—The Clydebank and District Water Trust invite offers for the construction of a storage reservoir on Burn Crooks, near Auchineden House, in the Parish of Killearn, the forming of a road of access from Stockiemuir-road thereto, and other relative work. Drawings may be seen at the office of Messrs. Warren & Stuart, civil engineers, 94, Hope-street, Glasgow, from whom copies of the specification, etc., may be obtained on payment of 1*l.* 1s.

APRIL 3.—**Harwich.**—SEWERAGE.—The B.C. of Harwich invite tenders for laying of about 1 mile of 6-in., 8-in., and 9-in. sewer, and for the construction of a septic tank and filters. Drawings, etc., may be seen, and bills of quantities and forms of tender obtained, on payment of a deposit of 2*l.* 2s., at the office of Mr. H. H. Packer, F.I.A.S., Dover-court; or that of Mr. Arthur J. Martin, M.Inst. C.E., 7, Victoria-street, Westminster, S.W.

APRIL 3.—**Luddenden Foot.**—PAVING.—Luddenden Foot U.D.C. invite tenders for the paving of 1,150 square yards of main road upon a concrete foundation. Bills of quantities, etc., may be obtained from Mr. J. Stockwell Bottomley, Surveyor, Council Offices, Luddenden Foot.

* APRIL 4.—**Bromley.**—ROADS.—The Bromley Corporation invite tenders for sewering, levelling, paving, metalling, channelling, and making good Canon-road, and for formation of a footpath of lime-Gravel Pits, in accordance with plans, sections, and specifications, which may be seen, and bills of stone, tar paving, and a sump in a street known as quantities obtained, at the Borough Engineer's Office. Tenders, endorsed "Street Improvement," to be delivered to the Town Clerk, Bromley, Kent, not later than 3 o'clock, April 4.

APRIL 4.—**Hale.**—MAKING-UP.—Hale U.D.C. invite tenders for the making-up of Oak-road, Hale. Plans, etc., can be seen, and bills of quantities and forms of tender obtained, on the payment of a deposit of 1*l.* 1s., at the office of the Council's Surveyor, Mr S. A. Pickering.

APRIL 4.—**Leeds.**—PAVING, ETC.—Leeds Highways Committee invite tenders for the paving and flagging of streets. Drawings may be seen at the City Engineer's Office, Municipal-buildings. Forms of tender, etc., may be obtained, and copies of the documents forming the contract inspected, on application at the Highways Office, 155, Kirkstall-road.

APRIL 8.—**Alnwick.**—SEPTIC TANK.—The R.D.C. of Alnwick invite tenders for converting the North Sewage Nettling Park at Embleton into a septic tank. The specification may be seen on application to Mr. Frank Wade, Embleton, and a copy thereof at the office of the Clerk, Mr. H. Walton, Alnwick.

APRIL 8.—**Blagdon.**—WATERWORKS.—Axbridge U.D.C. invite tenders for excavating trenches and laying-in same about 7½ miles of cast-iron socket water pipes, 6in. to 2in. in diameter. Also for constructing a reservoir and tank. Plans may be seen, and specifications, etc., obtained, from the Engineer, Mr. A. Powell, M.I.C.E., 10, Orchard-street, College Green, Bristol.

APRIL 8.—**Bowdon.**—ROAD WORKS.—Bowdon U.D.C. invite tenders for draining, levelling, curbing, channelling, metalling, lighting, and the making-up of Winton and Portland roads. A plan, etc., may be seen, and forms of tender obtained, at the office of Mr. C. E. Newton, civil engineer, 19, Cooper-street, Manchester; or at office of Mr. A. E. Paterson, Clerk, Council Offices, Bowdon.

APRIL 9.—**Abertridwr.**—STREET WORKS.—Caerphilly U.D.C. invite tenders for paving, kerbing, channelling, flagging, sewering, forming, and metalling, etc., of Tridwr-road, Abertridwr. Plans, etc., may be seen, and forms of tender obtained, at the Surveyor's Department, Council Offices, Caerphilly, upon depositing the sum of 1*l.* 1s.

APRIL 9.—**London.**—PAVING.—The Managers of Poplar and Stepney Sick Asylum District invite tenders for granolithic paving at the Sick Asylum, Devons-road, Bromley-by-Bow, London, E. Printed forms of tender, with all particulars, etc., may be obtained on application to the Engineer and Superintendent of Labour at the Asylum, as above.

APRIL 9.—**Southampton.**—ROAD IMPROVEMENT WORKS.—Southampton Corporation invite tenders for executing certain improvement works in Kingsley-road. Plans may be inspected, and specification, etc., obtained, at the Borough Engineer's Office, upon production of the Borough Treasurer's receipt for a deposit of 2*l.* 2s.

APRIL 10.—**St. Austell.**—DRAIN PIPES.—St. Austell R.D.C. invite tenders for the supply of socket drain pipes. Further particulars can be obtained of Mr. A. J. Blight, Highway Surveyor, Trelowth, St. Austell.

APRIL 12.—**Aldershot.**—RESERVOIR.—Aldershot Gas and Water Company invite tenders for the construction of a covered service reservoir and appurtenances at the Company's Reservoir Grounds, Cargate-hill, Aldershot. Copies of tender, etc., may be had on application to Mr. R. W. Edwards, Secretary and General Manager, Chief Offices, Victoria-road, Aldershot, accompanied by a deposit of 2*l.* 2s. and drawings may be inspected at the office of the Consulting Engineers, Messrs. John Taylor Sons, & Santo Crimp, Caxton House, Westminster, S.W. Tenders to the Secretary.

APRIL 12.—**Chester.**—SEWERS.—The R.D.C. of Chester invite tenders for the construction of sewers and appurtenant works for the townships of Bache, Great Boughton, Newton, and Upton. The work will be divided into three contracts. The drawing and specification for each contract may be seen at the office of the Engineer, Mr Frank E. Priest, M.Inst.C.E., 13, Harrington-street, Liverpool, from whom copies of the specification, etc., may be obtained on deposit of 2*l.* 2s. for each contract.

* APRIL 15.—**Westminster.**—BRICK SEWERS.—The Westminster City Council invite tenders for construction of about 250 lineal yards of 3-ft. 9-in. by 2-ft. 6-in. brick sewers, 88 lineal yards of 15-in., 20 lineal yards of 12-in., and 120 lineal yards of 9-in. stoneware pipe sewers, with manholes, lamp-holes, ventilators, gullies, etc., in various streets in the City of Westminster, in accordance with plans, etc., by the City Engineer. Plans can be seen, and copies of specification, bills of quantities, form of tender, etc., obtained, at Works Department, between 10 a.m. and 4 p.m. (Saturdays 10 a.m. to 1 p.m.). Tenders, on forms supplied, endorsed "Tender for Sewers Reconstruction," to be delivered to the Town Clerk, Westminster City Hall, Charing Cross-road, W.C., not later than 12 o'clock, April 15.

APRIL 19.—**Ambergate.**—RESERVOIR.—The Derwent Valley Water Board invite tenders for the construction of the Ambergate Covered Reservoir and the Whatstandwell to Belper section of the Derwent Aqueduct, in the county of Derby. The specification, etc., may be obtained on application to Mr. Edward Sandeman M.Inst.C.E., Engineer to the Board, at offices of Mr. O. B. Steward, Clerk to the Board, Bamford, near Sheffield, on payment of 5*l.* 5s.

APRIL 20.—**Elgin.**—SEWAGE WORKS.—Elgin T.C. invite offers for the construction of sewage disposal works at Pans, Elgin. Plans, etc., may be seen at the Burgh Surveyor's office, Greyfriars-street, Elgin, where schedules of quantities can be obtained on deposit of 1*l.*

NO DATE.—**Baildon.**—ROAD WORKS.—The construction of road, sewers, manholes, etc., on the Park Mount Avenue Estate, Kirklands-road, Baildon. Quantities on application to the surveyor, Mr. J. Harper Bakes, Calverley-chambers, Victoria-square, Leeds.

NO DATE.—**Pockley, Newton, etc.**—WATERWORKS.—The R.D.C's of Helmsley and Kirkbymoorside, Yorkshire, invite joint and separate tenders for the following joint works of water supply, viz.:—(1) Pockley, Harome, etc., in the Helmsley district (plans, etc., from Mr. J. Little, engineer, Carlisle, after April 7); (2) Nawton, Skiplam, etc., in the Kirkbymoorside district (plans, etc., after April 7, from Mr. J. E. Parker, A.M.I.C.E., engineer, Post Office-chambers, Newcastle-on-Tyne). Deposit of 2*l.* 2s. for each section.

STONE, MATERIALS, AND STORES.

APRIL 1.—**Banbury.**—STONE.—Banbury Guardians require 200 tons of unbroken Hartshill stone delivered at their Workhouse, Banbury. Mr. E. Lamley Fisher, Clerk, Union Offices, Banbury.

APRIL 1.—**Barrow-on-Soar.**—ROAD MATERIAL.—The R.D.C. of Barrow-upon-Soar invite tenders for the supply of road material. Tenders on forms, which may be obtained at office of Mr. Thomas Forward, Clerk to the Council, Union Offices, Mountsorrel.

APRIL 1.—**Rhymney.**—MATERIALS, ETC.—Rhymney U.D.C. invite tenders for the following:—(1) The hiring of a 10-ton steam roller and scarifier for about three months; (2) about 2000 tons of clean limestone, broken to a gauge of 2½ in.; (3) about 300 tons limestone gravel; (4) haulage of limestone and gravel per ton; (5) horse, cart, and man, day-work. Forms to be obtained from Mr. W. Lloyd Marks, Surveyor, 61, High-street, Rhymney.

APRIL 2.—**Poole.**—QUARRYING, ETC.—Poole R.D.C. invite tenders for quarrying, sifting, breaking, and yarding gravel, to pass a 2-in. gauge, and for team work. Forms of tenders and other particulars can be had at once on application. Mr. R. T. S. Seymour, District Surveyor, Wimborne Minster.

APRIL 2.—**Teddington.**—MATERIALS.—Teddington U.D.C. invite tenders for supply of granite flints, team labour, tools and implements, etc. Specifications and forms of tender, together with particulars, may be obtained on application to Mr. Marshall Hainsworth, Surveyor, Council Offices, Teddington.

APRIL 3.—**Hambledon.**—ROAD MATERIAL.—Hambledon R.D.C. invite tenders for the supply of good materials for use on the roads in the district of Hambledon, also for carting materials. Forms of tender and other information may be obtained of the Surveyor to the Council, Mr. Samuel B. Hasell, Eastwood-road, Bramley.

APRIL 3.—**Romney Marsh.**—MATERIALS.—Romney Marsh R. D. C. District Surveyor will attend at the Ship Hotel, New Romney, April 3, at 10 a.m., for the purpose of contracting for supply and delivery of the following materials, viz.:—1860 yards of Kentish rag, 1,890 yards of gravel, 1,315 tons of beach.

APRIL 3.—**Ticehurst.**—MATERIALS.—Ticehurst R.D.C. invite tenders for the supply and delivery of road materials. Forms of tender may be obtained upon forwarding stamped addressed envelope to the Surveyor, Mr. W. N. Wood, Ticehurst, Sussex.

APRIL 4.—**South Stoneham.**—CARTING.—South Stoneham R. D. C. invite tenders for the carting of gravel, and for the carting of flints and granite. Full particulars as to quantities and conditions can be had upon application to Mr. W. J. Potter, Glenroy, Portswood, the District Surveyor to the Council. Forms of tender can be obtained upon application at the office of Mr. E. T. Westlake, Clerk, 20, Portland-street, Southampton.

APRIL 5.—**London.**—MATERIALS.—South-Eastern and Chatham Railway Companies' Managing Committee invite tenders for the supply of stores from May 1, 1907, to April 30, 1908. Specifications, etc., may be had on application in writing to the Superintendent of Stores, 84, Tooley-street, London, S.E.

APRIL 5.—**Upholland.**—MATERIALS.—Upholland U.D.C. invite tenders for the supply of materials for the year ending March 31, 1908. Particulars from Mr. A. Hunt, Clerk to the Council, Council Offices, Upholland.

APRIL 5.—**Wigan.**—ROAD MATERIALS.—Wigan R.D.C. invite tenders for road materials for the year ending March 25, 1908. For further particulars apply to Mr. R. B. Marsh, Highway Surveyor, Dalton, Parbold, near Southport.

APRIL 6.—**Blean.**—ROAD MATERIALS, ETC.—Blean R.D.C. invite tenders for the supply and delivery of road materials. Tenders are also invited for the repair of the district roads. Full particulars may be obtained of the District Surveyor, Mr. F. A. Ward, Surveyor's Office, Eddington, near Canterbury.

APRIL 6.—**Wath-upon-Dearne.**—MATERIALS.—Wath-upon-Dearne U.D.C. invite tenders for the supply of road materials during the year ending March 31, 1908. Particulars and forms of tender may be obtained from Mr. H. C. Poole, Surveyor, Town Hall, Wath-on-Dearne.

APRIL 8.—**Edinburgh.**—ELECTRICITY SUPPLY.—Edinburgh Corporation invite tenders for the supply of material for the Electricity Supply Department for the year from May 16, 1907. Specifications, etc., can be obtained at the Engineer's Office, Dewar-place, Edinburgh, on payment of a deposit of 10s. for each specification.

APRIL 8.—**Tonbridge.**—MATERIALS.—Tonbridge R.D.C. invite tenders for the supply of chert, basalt, penlee, rag, and quartzite. Also the haulage of materials. Forms of tender and further particulars may be had on application to Mr. Frank Harris, Engineer and Surveyor, Broadway, Southborough, Tunbridge Wells.

APRIL 8.—**Uxbridge.**—GRANITE, ETC.—Uxbridge R.D.C. invite tenders for the supply of granite, gravel, and flints, for the repair of the district roads. Full particulars will be supplied on application to Mr. Edmund Birks, District Surveyor, Town Hall, Uxbridge.

APRIL 9.—**Cork.**—MATERIALS.—Cork Harbour Commissioners invite tenders for their annual supplies of timber, iron, and steel, paints and oils, brushes and brooms, metal castings, etc., in accordance with printed forms prepared for same, which may be had on application at the Engineer's Department, Harbour Commissioners' Offices, Custom-House-street, Cork. The forms of contract and bond, and specification and conditions of contract, can be inspected at the Commissioners' Offices.

APRIL 9.—**Horsham.**—MATERIALS.—Horsham R.D.C. invite tenders for the supply of about 4,500 cubic yards of flints, 300 cubic yards of local stone, and 2,750 cubic yards of granite or other approved stone. They also invite tenders for the carting of materials. Further particulars may be obtained of the Surveyor, Mr. W. Dengate, 58, Park-street, Horsham.

APRIL 9.—**Maldon.**—ROAD MATERIAL.—Maldon R.D.C. invite tenders for the supply and delivery of granite, slag, Kentish flints, picked stone, gravel, and carting. Forms of tender, etc., to be obtained of Mr. Edgar J. Ennals, Surveyor, 6, Market-hill, Maldon, Essex.

APRIL 9.—**Mountain Ash.**—TEAM WORK.—Mountain Ash U.D.C. invite tenders for the team work. Specification may be seen, and form of tender obtained, on application to the Surveyor to the Council, Town Hall, Mountain Ash.

APRIL 15.—**Bristol.**—STORES.—Contracts for stores from May, 1907, to April, 1908, for the Dock Committee. For forms of tender and further particulars apply to Mr. W. W. Squire, engineer, Cumberland Basin, Bristol.

APRIL 15.—**Wallasey.**—STORES.—Wallasey U.D.C. invite tenders for the supply of stores required for use at the Electricity Supply Works, Seaview-road, Liscard, Cheshire, viz.:—Cotton waste, coal shovels, bolts and nuts, switches and cutouts, etc., oils, etc., meters, gable and junction boxes, fire bars, incandescent lamps, arc lamp carbons, globe strains. Further particulars, etc., may be had on application to the Engineer, Mr. J. A. Crowther, at his office at the said works.

APRIL 17.—**Bradford.**—ROAD METAL.—Bradford Corporation invite tenders for the supply of about 20,000 tons of road metal. Form of tender may be obtained on application at the office of Mr. J. H. Cox, City Surveyor, at the Town Hall.

Public Appointments.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*ASSISTANT SURVEYOR	Brentford District Council...	120*l.* per annum	April 9
*CLERK OF WORKS	Carmarthenshire Educa. Com.	2*l.* 5*s.* per week	April 10

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*LEASE OF BUILDER'S PREMISES, ETC.—At Oakland-park, Weybridge	Bower-Binns. & Exbank	April
*DEALS, BATTENS, ETC.—Great Hall, Winchester House, Old Broad-street, E.C.	Churchill & Sims	April 10
*RESIDENTIAL PROPERTY, CHILD'S HILL—At the Mart	Furbers	April 24
*FREEHOLD BUILDING LAND, TOOTING COMMON—At the Mart	Hampton & Sons	April 30
*FREEHOLD BUILDING ESTATE, CLAPHAM COMMON—At the Mart	Thurgood & Martin..	June 20
*FREEHOLD ESTATE, LLANDRINDOD WELLS—At the Victoria Hall, Llandrindod Wells	Knight, Frank, & Rutley	September

Patents of the Week.

APPLICATIONS PUBLISHED*.

4,990 of 1906.—W. L. GRICE: *Hooks or Holders for Doors, Casements, and the like.*

This consists of a spring attached to the hook or holder in such a manner that it will prevent the hook from swinging, rattling, or from damaging the surfaces of the structure to which the said hook is fixed.

5,764 of 1906.—F. J. CHELL: *Stays or Fastenings for Windows.*

This relates to fastenings for windows, and consists in providing a split guard sleeve eccentrically pivoted about a fixed pin, and adapted to engage an abutment on the stay for the purpose of limiting the opening of the window.

7,120 of 1906.—J. BODINGTON and S. A. DANIELL, LTD.: *Taps and Dies with V Threads for Tapping and Screwing.*

This relates to a method of clearing the cut of taps or the cut of dies so that a hole may be tapped, or a pipe or bolt screwed with it without the possibility of any cuttings jamming the tap or die on withdrawing. The taps, instead of being turned, cut and chased in the usual manner, are turned and grooved first, and then have their threads milled with a rotary cutter, this cutter being caused by a cam to deepen the threads after the cutting edge of the tap is passed, the cutter returning to its first position at or just before the end of the thread is reached, and keeping in that position while passing over the groove until the next cutting edge is passed, and so on, this giving a clearance in the middle of the thread, not only on the top, but at the bottom and sides.

7,193 of 1906.—G. COLLINS: *Domestic Stoves.*

This relates to domestic stoves, and consists in the construction and arrangement of an air-pipe or pipes leading from the room into the chimney in such manner that the air in the upper part of such air-pipe or air-pipes is heated by the hot gases ascending from the fire.

7,453 of 1906.—E. H. BARBER: *Apparatus for Heating Water by Mixing Therewith Steam, Hot Water, or the like.*

This relates to an apparatus for heating water by mixing steam or hot water therewith, and consists of means for automatically cutting off the supply of steam or heating medium in the event of the water supply falling below a predetermined pressure, consisting of a cylinder or vessel mounted on the water supply pipe at a point between the source of water supply and the mixing-tap or point of discharge, a bell or piston capable of moving up and down in the cylinder, a spindle connected to the bell or piston, a spring or weight for bringing said piston back to its normal position, a cock on the steam or other heating medium supply pipe between the source of steam supply and the mixing-tap or point of discharge, together with an escape outlet, and a lever or levers for opening and closing said cock and the escape outlet.

9,854 of 1906.—E. R. H. EDKINS: *Self-Locking Fencing Dropper.*

This relates to a self-locking fencing dropper, having on one edge thereof a pair of corresponding curved or L-shaped slots arranged near each end thereof in combination with one or more intermediate curved L-shaped slots extending in a reverse direction to the two end slots.

13,906 of 1906.—E. H. MORGAN: *Smoke-consuming Firegrates, Furnaces, and the like.*

This relates to a smoke-consuming firegrate, furnace, and the like of the underfed type, and consists of a lower set or tier of bars connected by walls to an upper set of fire bars extending from the mouth of the receptacle formed by the lower set and the side walls, the receptacle having a front sliding gate or door and being surrounded by air spaces.

15,800 of 1906.—A. MARSDEN: *Construction of Sash Weights.*

This relates to a sash weight of the type in which a shell or casing is filled or loaded with metallic or other heavy refuse or slag, and is provided with internal or external end caps.

15,935 of 1906.—H. WATKIN: *Door Furniture.*

This relates to door furniture, and consists in the combination with a china, wood or compressed fibre door-knob rose, of a flanged and rebated metal disc fitting into a recess in said rose and adapted to clamp the rose between said flange and the face of the door.

16,056 of 1906.—C. H. LEFFINGWELL: *Safety Devices for Elevators or Lifts.*

This relates to a safety device for elevators or lifts, comprising a bar pivotally connected at one end with the slidable door of the lift, and pivoted at the other end to a lever, which is pivoted near one corner of the lift shaft and carries a catch which when actuated will project through an opening in the side of the shaft and enter a socket or opening in the side of the car or cage.

13,736 of 1906.—S. O. COWPER-COLES: *Ventilators.*

This relates to a ventilator comprising a frame in which are mounted two glass screens with a space between them, the inner of the said screens having a number of apertures, and the space between them being in communication with the outer air by means of one or more openings formed in the frame, which opening or openings are of less area than the apertures admitting the air to the room.

23,878 of 1906.—O. FREYTAG: *Means for Connecting and Facing Bricks and the like.*

This relates to a connecting apparatus for brick-moulding machines having an oscillatory suspended cutter-table, and consist in the construction wherein the pendulatory parts for suspending the cutting-table serve for guiding and supporting the said table and the clay supporting rollers.

25,693 of 1906.—G. HELBLING and DECO-ART. GES. VORMALS. G. HELBLING & Co., and THE LEEDS FIRECLAY CO., LTD.: *Fireclay Baths.*

This relates to the construction of fireclay baths, and is characterised by the top and bottom edges being made in parallel, and by the underside of the bottom being made with a sunk panel commencing near the foot and gradually getting deeper until it terminates near the head, and with a uniform or approximately uniform thickness of material over the panel, and having the bottom edges where the sides and bottom of the bath run into one another, formed with a single curve of small radius, about one-third to one-half the thickness of the walls of the bath.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

6,759 of 1906.—R. STICKDORN: *Closet-flushing Apparatus.*

This relates to a closet-flushing apparatus having a differential piston and a water reservoir or air chest, the distinguishing feature being that a part of the water for the reservoir flowing through a feed is conducted below the larger piston by way of a port as soon as the reservoir is suitably filled and pressure created therein, in such a manner that the differential piston is raised and effects the closing of the feed, as also the lifting of the valve, so that the water flows out of the tank immediately it is filled without further manipulation.

5,368 of 1906.—J. B. TOUYA: *Manufacture of Artificial Stone for Grinding or Abrasive and like Purposes.*

This consists in the manufacture of artificial stone for grinding or abrading purposes by incorporating pulverised rock crystal or emery with a binding mixture made from calcined and pulverised dolomite, mixed cold with chloride of magnesia which has been rendered liquid by exposure to the air.

17,988 of 1906.—LA SOCIÉTÉ ANONYME LE CHRYSO-CERAME: *Cementing in Position of Tiles for Covering Floors or Walls.*

This relates to a process for ensuring the securing of ceramic, moulded glass, and like tiles, and consists in providing the sides of each tile with portions set back relatively to the front face of each tile, by using in their construction layers of material each having a different co-efficient of contraction during the drying, baking, or burning operation, the purpose of said recessed portions being to produce, when the tiles are put in place, hollow spaces between them of such shape that when filled with cement they form between the tiles retaining rods or beads.

24,148 of 1906.—C. F. SCHLICKEYSEN: *Clay Presses.*

This relates to a clay press comprising a cylinder, helicoidal cutters rotating in the said cylinder, and rings made of steel or other suitable material secured to the inner wall of the press cylinder in the intervals left between the helicoidal cutters, the said rings being adapted to reduce the free section of passage of the press cylinder.

20,530 of 1906.—B. T. KING (J. T. CLARKE): *Pipe and like Wrenches.*

This relates to a pipe and like wrench having a handle carrying a stationary jaw and a movable pivoted jaw, an operating mechanism carried by the handle, a rod, and a lever link connected to the rod and to the movable jaw, said lever link having a sliding movement on a fulcrum element.

24,645 of 1906.—H. BIRKBECK: *Fencing Droppers.*

This relates to fencing droppers, and consists of oppositely directed slots arranged on one edge thereof in combination with corresponding reverse slots in the other edge thereof, said slots having flared or enlarged mouths.

28,209 of 1906.—J. G. PAWSEY: *Sink Trap.*

This relates to a self-containing trap for earthenware scullery sinks, having a cylindrical or tapering body provided with internal partitions forming a water seal chamber, and is characterised by a perforated plate of larger diameter than the body and made fast to the latter so as to overhang and form a flange around its top part, and by an external packing of felt, flannel, asbestos, rubber, or the like yielding material cemented, sewn, or bound around the body immediately under said flange.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

March 18.—By FULLER, HORSEY, SONS, & CASSELL.

Old Kent Road.—Haymerle-rd., contractor's yard and stabling, u.t. 50 yrs., g.r. 85*l.*, area 20,000 ft. £1,025

By JOSEPH HIBBERD & SONS.

Totteridge, Herts.—"Totteridge House," f., 23 a., p. 7,800

March 19.—By ADAMS & WATTS.

Wimbledon.—Havelock-rd., f.g.r. 10*l.* 215

By BEALE & CAPPS.

Acton.—Twyford-av., l.g.r. 21*l.* 19s., u.t. 97 yrs., g.r. 6*l.* 18s. 6d. 280

Notting Hill.—30 and 31, Archer-st. (s.), u.t. 43½ yrs., g.r. 16*l.*, y.r. 115*l.* 1,000

28, Archer-st. (s.), l., y.r. 52*l.* 10s. 745

By BOX & MACHIN.

Dalston.—118, Graham-rd., u.t. 54¾ yrs., g.r. 7*l.*, p. 300

By MESSRS. FURBER.

Putney.—151 and 153, Lower Richmond-rd., and 1 to 9 (odd), Stanbridge-rd., u.t. 60¼ yrs., g.r. 17*l.* 10s., y.r. 204*l.* 1,600

By GIDDY & GIDDY.

St. John's Wood.—78, Hamilton-ter., u.t. 29 yrs., g.r. 21*l.*, y.r. 150*l.* 1,525

By CLAUDE LOUND (at Masons' Hall Tavern),

Tooting.—The Gorringe-pk. Hotel, l., goodwill and p. 8,910

By GEO. HEAD & CO.

Walworth.—10 to 16 (even), Blackwood-st., f., w.r. 137*l.* 16s. £1,080

By GEORGE LOVEITT & SONS (at Coventry).

Coventry, Warwick. — Spon-st., "Woolpack Inn," p.h., f. 1,000

59, Spon-st. (s.), f. 480

"Hare and Hounds," p.h., f. 5,000

March 20.—By W. A. BALL.

Hampstead.—103 and 105, Hampstead-rd. (s.), and 1A, Netley-st., f., y.r. 285*l.* 4,325

Euston Road.—49, Stanhope-st. (s.), f., y.r. 60*l.* 1,050

By P. GOODMAN.

Battersea.—Salcot-rd., etc., f.g.r. 108*l.* 2,648

By FOSTER & CRANFIELD.

Balham.—Lochinvar-st., etc., f.g.r. 24*l.* 580

Finsbury.—39 and 41, Great Arthur-st., u.t. 76 yrs., g.r. 308*l.*, y.r. 1,000*l.* 9,000

By HUMBERT & FLINT.

South Kensington.—3, Egerton-gdns., u.t. 69 yrs., g.r. 45*l.*, y.r. 250*l.* 2,650

By MAY & PHILPOT.

Brixton.—3, Gothic-villas, u.t. 67 yrs., g.r. 22*l.* 10s. 650

44, Beechdale-rd., u.t. 83 yrs., g.r. 7*l.* 10s., e.r. 45*l.*, p. 470

Streatham.—25, Westwell-rd., u.t. 92 yrs., g.r. 8*l.* 550

50 and 54, Baldry-gdns., u.t. 97 yrs., g.r. 17*l.* 1,100

30, Mount Ephraim-la., u.t. 95 yrs., g.r. 9*l.*, e.r. 50*l.*, p. 500

By CHAS. P. WHITELEY & SON.

Stockwell.—Moat House, f., y.r. 70*l.* 1,200

By DOUGLAS YOUNG & CO.

Camden Town.—45, York-rd., u.t. 54 yrs., g.r. 6*l.*, e.r. 42*l.* 380

Willesden.—15 and 17, Station-rd., u.t. 71 yrs., g.r. 15*l.*, y.r. 60*l.* 400

Kilburn.—6, Glengall-rd., f., y.r. 48*l.* 550

Fulham.—Brecon-rd., f.g.r. 10*l.* 215

104 and 106, Bayonne-rd., f., w.r. 67*l.* 12s. .. 550

17, 19, 21, and 23, Munster-rd., u.t. 74 yrs., g.r. 34*l.*, y.r. 172*l.* 1,050

March 21.—By H. J. BLISS & SONS.

Old Ford.—52 and 54, Medway-rd., u.t. 42½ yrs., g.r. 8*l.*, w.r. 72*l.* 16s. 520

Wood Green.—44, Commerce-rd. (s.), f., y.r. 36*l.* 410

Haggerston.—42, 43, and 44, Regent's-row, u.t. 37½ yrs., g.r. 7*l.*, w.r. 85*l.* 440

Hackney.—103 to 113 (odd), Weymouth-ter., u.t. 6¾ yrs., g.r. 21*l.*, w.r. 189*l.* 255

Bethnal Green.—12 and 13, North-pl., f., w.r. 39*l.* 255

27, Hersee-pl., 6, Moss-st., 62, St. Stephen's-rd., f., w.r. 131*l.* 1,145

108 and 110, Coventry-st., w.r. 29*l.*, and plot of building land, f. 310

137, Green-st., f., y.r. 50*l.* 630

4 and 6, Sale-st., 40 to 46 (even), Bandon-rd., 116 and 118, Green-st., u.t. 66 yrs., 52¼ yrs., and 12½ yrs. respectively, g.r. 98*l.*, w.r. 334*l.* 1,265

Finchley.—Lichfield-gr., etc., f.g.r. 39*l.* 995

85, Lichfield-gr., f., y.r. 42*l.* 440

Hammersmith.—294, Goldhawk-rd., u.t. 30 yrs., g.r. 6*l.*, y.r. 50*l.* 300

Clapton.—225, Evering-rd., u.t. 67 yrs., g.r. 8*l.* 10s., e.r. 60*l.* 400

45, Cricketfield-rd., u.t. 50 yrs., g.r. 7*l.* 7s., y.r. 36*l.* 240

Hackney.—42 and 44, Terrace-rd., u.t. 25 yrs., g.r. 10*l.*, w.r. 66*l.* 240

Kingsland.—24, Enfield-rd., u.t. 16¾ yrs., g.r. 4*l.*, w.r. 34*l.* 110

Camberwell.—69, Camden-gr. North, u.t. 55½ yrs., g.r. 4*l.*, w.r. 26*l.* 215

By W. A. ELLIS.

South Kensington.—40 and 41, Thurloe-sq., u.t. 20½ yrs., g.r. 16*l.*, y.r. 340*l.* 3,120

9, Alfred-pl. West, u.t. 21 yrs., g.r. 10*l.*, y.r. 110*l.* 795

By FAREBROTHER, ELLIS, & CO.

Willesden.—Stonebridge-pk., freehold building land 4,000

By C. C. & T. MOORE.

Old Ford.—71 to 85 (odd), Milton-rd., f., w.r. 189*l.* 1,400

Dalston.—2, 4, 8, 10, and 12, Livermere-rd., u.t. 32 yrs., g.r. 16*l.*, y.r. 182*l.* 1,150

Maryland Point.—9, 11, 13, and 15, North-st., f., w.r. 72*l.* 380

Shadwell.—16 to 20, Station-pl., u.t. 696 yrs., g r. 30*l.*, w.r. 175*l.* 100

By MOSS & GRAY.

Upton Park, Essex.—15, Elizabeth-rd., f., w.r. 28*l.* 300

By NEWBON, SHEPHARD, & EDWARDS.

Hornsey.—23, Hornsey Park-rd., and 22, Mulkern-rd., f., y.r. 54*l.* 580

Barnsbury.—79, Richmond-rd., u.t. 44 yrs., g.r. 44*l.*, y.r. 55*l.* 475

Kentish Town.—21, Churchill-rd., u.t. 61 yrs., g.r. 7*l.*, w.r. 40*l.* 340

Holloway.—30, Jackson-rd., u.t. 56 yrs., g.r. 6*l.* 6s., y.r. 38*l.* 320

Mile End.—53, White Horse-la. (s.), f., y.r. 46*l.* 400

By STIMSON & SONS.

New Cross.—37 to 45 (odd), Briant-st., f., w.r. 182*l.* 1,300

Blackfriars.—1A, Commercial-rd., c. 390

22, 24, and 26, Broadwall, u.t. 8½ yrs., g.r. 13*l.* 10s., y.r. 121*l.* 400

70 and 72, Broadwall, u.t. 55 yrs., g.r. 8*l.*, w.r. 83*l.* 450

Islington.—43, Hanover-st., u.t. 29½ yrs., g.r. 7*l.*, y.r. 38*l.* 230

Wandsworth.—32, Birdhurst-rd., u.t. 75 yrs., g.r. 5*l.*, w.r. 26*l.* 245

Stockwell. — 46, Tasman-rd., u.t. 68 yrs., g.r. 6*l.*, y.r. 32*l.* 305

By J. A. & W. THARP.

East Ham.—30, Wordsworth-av., f., w.r. 26*l.*... 290

Bethnal Green.—77, Hare-st. (s.), f., e.r. 36*l.* .. 430

Leytonstone.—103, Wallwood-rd., f., e.r. 35*l.*... 430

Mile End.—61, Alderney-rd. (s.), f., y.r. 32*l.* .. 400

By WALLACE & RIEBOLD.

Caledonian-rd.—145, Bemerton-st., u.t. 37½ yrs., g.r. 6*l.*, w.r. 50*l.* 190

Barnsbury.—30, Matilda-st., u.t. 37 yrs., g.r. 5*l.*, y.r. 36*l.* £255

9, Boxworth-gr., u.t. 29 yrs., g.r. 8*l.*, y.r. 45*l.* 230

38, Muriel-st., u.t. 14 yrs., g r. 4*l.* 4s., y.r. 30*l.* 120

6, Grace-st., u.t. 23 yrs., g r. 10*l.*, y.r. 34*l.* .. 150

March 22.—By DOWSETT, KNIGHT, & CO.

Waltham Abbey, Essex.—"The Lawn," Church-st., f., p. 950

53 and 55, High Bridge-st., f., w.r. 26*l.* 345

By PROTHEROE & MORRIS.

New Malden.—"Alverstone," Thetford-rd., f., p. 730

By WALTER WINDRUM.

Bow.—3, Morgan-st., u.t., 30½ yrs., g.r. 3*l.* 10s., y.r. 28*l.* 170

By WRIFORD, DIXON, & WINDER.

Chelsea.—38, Upper Cheyne-row, f., w.r. 32*l.* 10s. 320

40 and 42, Upper Cheyne-row, f., w.r. 65*l.* .. 660

***Contractions used in these lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold, p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. beerhouse; p.h. for public-house; o. for office; s. for shops; ct. for court.**

MEETINGS.

MONDAY, APRIL 1.

Liverpool Architectural Society.—Annual General Meeting.

WEDNESDAY, APRIL 3.

Edinburgh Architectural Association.—Mr. A Lindsay on "Building Practice." 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

Manchester Society of Architects (Club Night).—Exhibition of Working Drawings and discussion thereon.

THURSDAY, APRIL 4.

Civil and Mechanical Engineers' Society.—Mr. Gordon Stewart on "Steam Traps." 8 p.m.

TERMS OF SUBSCRIPTION.

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PRICES CURRENT OF MATERIALS.

***** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.**

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 8 0	per 1000 alongside, in river.
Rough Stocks and Grizzles	1 6 0	„ „ „
Picked Stocks for Facings	2 10 0	„ delivered.
Flettons	1 8 0	„ at railway depôt.
Red Wire Cuts	1 14 0	„ „ „
Best Fareham Red	3 12 0	„ „ „
Best Red Pressed Buabon Facing	5 0 0	„ „ „
Best Blue Pressed Staffordshire	3 15 0	„ „ „
Do. Bullnose	4 0 0	„ „ „
Best Stourbridge Fire Bricks	3 14 0	„ „ „
GLAZED BRICKS.		
Best White and Ivory Glazed Stretchers	12 0 0	„ „ „
Headers	11 0 0	„ „ „
Quoins, Bullnose, and Flats	16 0 0	„ „ „
Double Stretchers	19 0 0	„ „ „
Double Headers	16 0 0	„ „ „
One Side and two Ends	19 0 0	„ „ „
Two Sides and one End	20 0 0	„ „ „
Splays, Chamferred, Squints	20 0 0	„ „ „
Best Dipped Salt Glazed Stretchers, and Header	12 0 0	„ „ „
Quoins, Bullnose, and Flats	14 0 0	„ „ „
Double Stretchers	15 0 0	„ „ „
Double Headers	14 0 0	„ „ „
One Side and two Ends	15 0 0	„ „ „
Two Sides and one End	15 0 0	„ „ „
Splays, Chamferred, Squints	14 0 0	„ „ „
Second Quality White and Dipped Salt Glazed	2 0 0	„ less than best.
	s. d.	
Thames and Pit Sand	7 0	per yard, delivered.
Thames Ballast	5 6	„ „
Best Portland Cement	28 0	per ton, „
Best Ground Blue Lias Lime	19 0	„ „

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 11s. 6d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

STONE.

	s.	d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1	6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1	8¼	,, ,,
PORTLAND STONE (20 ft. average)—Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf...	2	1	,, ,,
White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf...	2	2½	,, ,,

	s.	d.	
Ancaster in blocks	1	10	per ft. cube, deld. rly. depôt.
Beer ,,	1	6	,, ,,
Greenshill ,,	1	10	,, ,,
Darley Dale in blocks	2	4	,, ,,
Red Corsehill ,,	2	2	,, ,,
Closeburn Red Freestone	2	0	,, ,,
Bed Mansfield ,,	2	4	,, ,,

YORK STONE—*Robin Hood Quality.*

Scappled random blocks.	2	10	,, ,,
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	3	per ft. super., ,,
6 in. rubbed two sides ditto, ditto	2	6	,, ,,
3 in. sawn two sides slabs (random sizes)	0	11½	,, ,,
2 in. to 2½ in. sawn one side slabs (random sizes)	0	7½	,, ,,
1½ in. to 2 in. ditto, ditto	0	6	,, ,,

HARD YORK—

Scappled random blocks.	3	0	per ft. cube, ,,
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	8	per ft. super., ,,
6 in. rubbed two sides ditto	3	0	,, ,,
3 in. sawn two sides slabs (random sizes)	1	2	,, ,,
2 in. self-faced random flags	0	5	,, ,,

SLATES.

In. In.	£	s.	d.	
20×10 best blue Bangor	13	2	6	per 1000 of 1200 at r. d.
20×12 ,, ,,	13	17	6	,, ,,
20×10 first quality ,,	13	0	0	,, ,,
20×12 ,, ,,	13	15	0	,, ,,
16×8 ,, ,,	7	5	0	,, ,,
20×10 best blue Portmadoc	12	12	6	,, ,,
16×8 ,, ,,	6	12	6	,, ,,
20×10 best Eureka unfading green	15	17	6	,, ,,
20×12 ,, ,,	18	7	6	,,
18×10 ,, ,,	13	5	0	,, ,,
16×8 ,, ,,	10	5	0	,, ,,
20×10 permanent green	11	12	6	,, ,,
18×10 ,, ,,	9	12	6	,, ,,
16×8 ,, ,,	6	12	6	,, ,,

TILES.

	s.	d.	
Best plain red roofing tiles	42	0	per 1000 at rly. depôt.
Hip and Valley tiles	3	7	per doz. ,,
Best Broseley tiles	50	0	per 1000 ,,
Do. Ornamental tiles	52	6	,, ,,
Hip and Valley tiles	4	0	per doz. ,,
Best Ruabon red, brown, or brindled do. (Edwards)	57	6	,, ,,
Do. Ornamental do.	60	0	,, ,,
Hip tiles	4	0	per doz. ,,
Valley tiles	3	0	,, ,,
Best Red or Mottled Staffordshire do. (Peakes)	51	9	per 1000 ,,
Do. Ornamental do.	54	6	,, ,,
Hip tiles	4	1	per doz. ,,
Valley tiles	3	8	,, ,,
Best "Rosemary" brand plain tiles	48	0	per 1000 ,,
Best Ornamental tiles	50	0	,, ,,
Hip tiles	4	0	per doz. ,,
Valley tiles	3	8	,, ,,
Best "Hartshill" brand plain tiles, sand-faced	50	0	per 1000 ,,
Do. pressed	47	6	,, ,,
Do. Ornamental do.	50	0	,, ,,
Hip tiles	4	0	per doz. ,,
Valley tiles	3	6	,, ,,

WOOD.

BUILDING WOOD.	At per standard. £	s.	d.		£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13	10	0	...	15	0	0
Deals: best 3 by 9	13	0	0	...	14	0	0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11	0	0	...	12	0	0
Battens: best 2½ by 6 and 3 by 6	0	10	0		less than 7 in. and 8 in.		
Deals: seconds	1	0	0		less thn best.		
Battens: seconds	0	10	0	,,	,,		
2 in. by 4 in. and 2 in. by 6 in.	9	0	0	...	10	0	0
2 in. by 4½ in. and 2 in. by 5 in.	8	10	0	...	9	10	0
Foreign Sawn Boards— 1 in. and 1¼ in. by 7 in.	0	10	0		more than battens.		
¾ in.	1	0	0		,,		
	At per load of 50 ft.						
Fir timber: best middling Danzig or Memel (average specification)	4	10	0	...	5	0	0
Seconds	4	0	0	...	4	10	0
Small timber (8 in. to 10 in.)	3	12	6	...	3	15	0
Small timber (6 in. to 8 in.)	3	0	0	...	3	10	0
Swedish balks	2	10	0	...	3	0	0
Pitch-pine timber (30 ft. average)	4	0	0	...	4	15	0

JOINERS' WOOD.	At per standard. £	s.	d.		£	s.	d.
White Sea: first yellow deals, 3 in. by 11 in.	24	0	0	...	25	0	0
3 in. by 9 in.	22	0	0	..	23	0	0
Battens, 2½ in. and 3 in. by 7 in.	16	10	0	...	18	0	0
Second yellow deals, 3 in. by 1 in.	18	10	0	...	20	0	0
,, ,, 3 in. by 9 in.	17	10	0	...	19	0	0
Battens, 2½ in. and 3 in. by 7 in.	13	10	0	...	14	10	0
Third yellow deals, 3 in. by 11 in. and 9 in.	13	10	0	...	15	0	0
Battens, 2½ in. and 3 in. by 7 in.	11	0	0	...	12	0	0

WOOD (*continued*).

JOINERS' WOOD—(*continued*).	At per standard. £	s.	d.		£	s.	d.
Petersburg first yellow deals, 3 in. by 11 in.	21	0	0	...	22	10	0
Do. 3 in. by 9 in.	18	0	0	...	19	10	0
Battens	13	10	0	...	15	0	0
Second yellow deals, 3 in. by 11 in.	16	0	0	...	17	0	0
Do. 3 in. by 9 in.	14	10	0	...	16	0	0
Battens	11	0	0	...	12	10	0
Third yellow deals, 3 in. by 11 in.	13	0	0	...	14	0	0
Do. 3 in. by 9 in.	12	10	0	...	14	0	0
Battens	10	0	0	...	11	0	0
White Sea and Petersburg—							
First white deals, 3 in. by 11 in.	14	10	0	...	15	10	0
,, ,, 3 in. by 9 in.	13	10	0	...	14	10	0
Battens	11	0	0	...	12	0	0
Second white deals, 3 in. by 11 in.	13	10	0	...	14	10	0
,, ,, 3 in. by 9 in.	12	10	0	...	13	10	0
,, ,, battens	10	0	0	...	11	0	0
Pitch-pine: deals	18	0	0	...	21	0	0
Under 2 in. thick extra	0	10	0	...	1	0	0
Yellow Pine—First, regular sizes	44	0	0		upwards.		
Oddments	32	0	0		,,		
Seconds, regular sizes	33	0	0		,,		
Yellow Pine oddments	28	0	0		,,		
Kauri Pine—Planks, per ft. cube	0	3	6	...	0	5	0
Danzig and Stettin Oak Logs— Large, per ft. cube	0	3	0	...	0	3	6
Small ,, ,,	0	2	6	...	0	2	9
Wainscot Oak Logs, per ft. cube	0	5	6	...	0	6	0
Dry Wainscot Oak, per ft. sup. as inch	0	0	8½	...	0	0	9½
¾ in. do. do	0	0	7	...	—		
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0	0	9	...	0	1	0
Selected, Figury, per ft. super. as inch	0	1	6	...	0	2	6
Dry Walnut, American, per ft. super. as inch	0	0	10	...	0	1	0
Teak, per load	17	0	0	...	22	0	0
American Whitewood Planks, per ft. cube	0	4	0	...	0	5	0
Prepared Flooring, etc.—	Per square.						
1 in. by 7 in. yellow, planed and shot	0	13	6	...	0	17	6
1 in. by 7 in. yellow, planed and matched	0	14	0	...	0	18	0
1¼ in. by 7 in. yellow, planed and matched	0	16	0	...	1	0	0
1 in. by 7 in. white, planed and shot	0	12	0	...	0	14	6
1 in. by 7 in. white, planed and matched	0	12	6	...	0	15	0
1¼ in. by 7 in. white, planed and matched	0	15		...	0	16	6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0	11	0	...	0	13	6
1 in. by 7 in. ,, ,,	0	14	0	...	0	18	0
¾ in. by 7 in. white ,, ,,	0	10	0	...	0	11	6
1 in. by 7 in. ,, ,, ,,	0	12	9	...	0	15	0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £	s.	d.		£	s.	d.
Rolled Steel Joists, ordinary sections	7	7	6	...	7	15	0
Compound Girders, ordinary sections	9	10	0	...	10	10	0
Steel Compound Stanchions	12	5	0	...	13	5	0
Angles, Tees, and Channels, ordinary sections	9	5	0	...	10	5	0
Flitch Plates	9	5	0	...	10	5	0
Cast Iron Columns and Stanchions including ordinary patterns	8	0	0	...	9	0	0

METALS.

	Per ton, in London. £	s.	d.		£	s.	d.
IRON—							
Common Bars	8	10	0	...	9	0	0
Staffordshire Crown Bars, good merchant quality	9	5	0	...	9	15	0
Staffordshire "Marked Bars"	11	0	0	...	—		
Mild Steel Bars	9	10	0	...	9	15	0
Hoop Iron, basis price	9	15	0	...	10	0	0
,, ,, Galvanised	17	10	0	...	—		
(*And upwards, according to size and gauge.)							
Sheet Iron Black—							
Ordinary sizes to 20 g.	10	0	0	...	—		
,, ,, 24 g.	11	0	0	...	—		
,, ,, 26 g.	12	10	0	...	—		
Sheet Iron, Galvanised, flat, ordinary quality—							
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	16	0	0	...	—		
Ordinary sizes to 22 g. and 24 g.	16	10	0	...	—		
,, ,, 26 g.	17	0	0	...	—		
Sheet Iron, Galvanised, flat, best quality—							
Ordinary sizes to 20 g.	19	0	0	...	—		
,, ,, 22 g. and 24 g.	19	10	0	...	—		
,, ,, 26 g.	21	0	0	...	—		
Galvanised Corrugated Sheets—							
Ordinary sizes 6 ft. to 8 ft. 20 g.	16	0	0	...	—		
,, ,, 22 g. and 24 g.	16	5	0	...	—		
,, ,, 26 g.	17	10	0	...	—		
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	13	0	0	...	—		
Best Soft Steel Sheets, 22 g. & 24 g.	14	0	0	...	—		
,, ,, ,, 26 g.	16	0	0	...	—		
Cut Nails, 3 in. to 6 in.	10	15	0	...	11	5	0
(Under 3 in., usual trade extras.)							

LEAD, &c.

	Per ton, in London. £	s.	d.		£	s.	d.
LEAD—Sheet, English, 3lb. and up.	22	15	0	...	—		
Pipe in coils	23	5	0	...	—		
Soil pipe	25	5	0	...	—		
Compo pipe	26	5	0	...	—		
ZINC—Sheet—							
Vieille Montagne ton	34	5	0	...	—		
Silesian	34	0	0	...	—		
COPPER—							
Strong Sheet per lb.	0	1	4	...	—		
Thin ,, ,,	0	1	5	...	—		
Copper nails ,,	0	1	3	...	—		
BRASS—							
Strong Sheet ,,	0	1	2	...	—		
Thin ,, ,,	0	1	3	...	—		

LEAD, &c. (*continued*).

	Per ton, in London. £	s.	d.		£	s.	d.
TIN—English Ingots ,,	0	1	11	...	—		
SOLDER—Plumbers' ,,	0	0	9	...	—		
Tinmen's ,,	0	0	11½	...	—		
Blowpipe ,,	0	1	1	...	—		

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

15 oz. thirds	2½d.	per ft. delivered.	
,, fourths	1½d.	,,	,,
21 oz. thirds	3½d.	,,	,,
,, fourths	2½d.	,,	,,
26 oz. thirds	4½d.	,,	,,
,, fourths	3½d.	,,	,,
32 oz. thirds	5d.	,,	,,
,, fourths	4½d.	,,	,,
Fluted Sheet, 15 oz.	3½d.	,,	,,
,, 21 oz.	4½d.	,,	,,

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

⅛ Hartley's	2½d.	per ft. delivered.	
3/16 ,,	2½d.	,,	,,
¼ ,,	3d.	,,	,,
Figured and Oxford Rolled "Oceanic" Glass, white	4d.	,,	,,
Do. ,, tinted	5½d.	,,	,,

OILS, &c.

		£	s.	d.
Raw Linseed Oil in pipes	per gallon	0	1	1
,, ,, ,, in barrels	,,	0	2	0
,, ,, ,, in drums	,,	0	2	2
Boiled ,, ,, in pipes	,,	0	2	1
,, ,, ,, in barrels	,,	0	2	2
,, ,, ,, in drums	,,	0	2	4
Turpentine in barrels	,,	0	4	4
,, in drums	,,	0	4	7
Genuine Ground English White Lead	per ton	26	0	0
Red Lead, Dry	,,	24	10	0
Best Linseed Oil Putty	per cwt.	0	7	0
Stockholm Tar	per barrel	1	12	0

VARNISHES, &c.

	Per gallon. £	s.	d.
Fine Pale Oak Varnish	0	8	0
Pale Copal Oak	0	10	6
Superfine Pale Elastic Oak	0	12	6
Fine Extra Hard Church Oak	0	10	0
Superfine Hard-drying Oak, for seats of Churches	0	14	0
Fine Elastic Carriage	0	12	6
Superfine Pale Elastic Carriage	0	16	0
Fine Pale Maple	0	16	0
Finest Pale Durable Copal	0	18	
Extra Pale French Oil	1	1	0
Eggshell Flatting Varnish	0	18	0
White Copal Enamel	1	4	0
Extra Pale Paper	0	12	0
Best Japan Gold Size	0	10	6
Best Black Japan	0	16	0
Oak and Mahogany Stain	0	9	
Brunswick Black	0	8	6
Berlin Black	0	16	0
Knotting	0	10	0
French and Brush Polish	0	10	0

TO CORRESPONDENTS

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

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All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ASHTON-IN-MAKERFIELD.—For making-up private streets, for the Urban District Council. Mr. T. Burgess, Surveyor, Council Offices, Ashton-in-Makerfield:—

	£	s.	d.
T. W. Rigby	5,133	0	0
P. Pennington & Sons, Ltd.	4,858	13	7
Kearsley & Gee	4,661	8	1
Winnard & Taylor	4,432	4	7
Cowburn & Son	4,419	12	1
J. & F. Lomax	4,290	0	0
Webster & Warstanley, Wigan*	4,201	14	11
P. & S. Kearsley	4,127	11	10

ASH.—For building a pair of cottages, Firacre-road, for Major Mackay. Messrs. Friend & Lloyd, architects, Grosvenor-road, Aldershot:—

H. W. Yates	£572 0 0	Poulter Bros.	£482 0 0
Parsons & Allen	523 15 6	F. Knight	475 0 0
W. Wells King	510 0 0	R. H. Irwin	453 0 0
W. Stilwell	510 0 0	R. Hunt, Ash Vale, Surrey	450 0 0
A. J. Galsworthy	496 0 0		

BARNET.—For the erection of nurses' home at the Workhouse, for the Guardians. Messrs. White, Son, & Pill, architects, Barnet:—

Thomas & Edge	£1,613	W. M. Butcher	£1,210
Hyde & Co.	1,495	W. Wade	1,196
J. Willmott & Sons	1,492	Myall & Upson	1,180
Fitch & Cox	1,422	G. E. Wallis & Sons, Ltd.	1,150
Mattock & Parsons	1,379	S. Worboys	1,147
C. W. Dumpleton	1,298	Pasterfield & English	1,146
W. H. Sharpe	1,296	F. & G. Foster	996
F. W. Harris	1,290	Weibking & Co.	975
Ekins & Co., Ltd.	1,280	Winter & Sons	975
Pearson & Son	1,223	J. Behrend	973
J. Stewart	1,220		
A. Fairhead & Son	1,220		

BATH.—For erecting a shelter and lavatories at Alexandra Park, for the Corporation. Mr. Silvanus White, Surveyor of Corporate Property, Bath:—

A. Wills & Sons, Bath £185

CHATHILL.—For erecting four houses at Sea Houses, Chathill, Northumberland, for Mr. W. Matthews. Mr. George Reavell, jun., A.R.I.B.A., Alnwick and Morpeth:—

E. Fordy { £1,012 3 0 Lowest of three whole tenders. 974 1 8 With deductions.

CHELTENHAM.—For building shop and dwelling-houses at Bishop-street and Henrietta-street, for Miss Quigley. Mr. Daniel Conroy, architect, 21, Shipquay-street, Londonderry:—

E. Maultsaid	£883	Stuart Bros.	£661
M. Sweeney	745	Shannon & Routledge	632
J. Smyth	733	W. Cooke, Bishop-street*	583
E. Hughes	705		

DONCASTER.—For erecting a retort-house and coal-store extension with iron-trussed roofs at the gasworks, for the Gas Committee. Mr. R. Watson, Engineer, Gasworks, Doncaster:—

Beastall & Sons, Doncaster £3,300

EXETER.—For carrying out works for Governors of the Royal West of England Institution for the Deaf and Dumb, Exeter. Mr. J. Jerman, F.R.I.B.A., 1, Bedford-circus, Exeter. Quantities by architect:—

Luscombe & Son	£4,989	Woodman & Son	£4,189
F. J. Stanbury	4,792	Ham & Passmore	4,170
L. Smale	4,404	Bunclarke & Stephens	4,110
Westcott, Austin, & White	4,400	W. E. Blake	4,080
W. Brealy	4,389	G. Herbert	4,079
Speller & Sons	4,250	Stephens & Son	3,988
E. Mudge	4,225	G. Setter, Exeter*	3,850
W. G. Coles	4,220		

HANDSWORTH.—For raising and reconstructing iron roof of the carshed, rebuilding walls, etc., at Tramway Depôt, Birchfield-road, for the Urban District Council. Mr. H. Richardson, Surveyor, Council House, Handsworth, Birmingham:—

Hill & Smith	£1,257 0 0	E. Garfield	£1,150 0 0
T. Elvins	1,215 0 0	Hulbert & Ladbury, Handsworth*	1,018 14 4
J. E. Moorhouse	1,199 0 0		
G. Webb & Son	1,175 0 0		

HANDSWORTH.—For drainage, alterations to inspection pits, etc., at the Tramway Depôt, Birchfield-road, for the Urban District Council. Mr. H. Richardson, A.M.Inst.C.E., Council House, Handsworth, Birmingham:—

Aird & Son	£374 16 1	G. Holloway	£287 0 0
J. E. Moorhouse	348 0 0	Hulbert & Ladbury, Handsworth*	242 15 6
E. Garfield	347 0 0		
S. Wood	310 0 0		

HULL.—For foundations and basement of proposed shops, Jameson-street, for the Property Committee of the Corporation. Mr. J. H. Hirst, City Architect, Town Hall. Quantities by Architect:—

J. Sangwin	£1,604 0 0	M. Harper	£1,231 0 0
J. Brunton	1,554 6 9	J. T. Levitt	1,211 0 0
G. Houlton & Son	1,260 0 0	Quibell, Son, & Greenwood	1,196 0 0
T. Goates	1,256 18 0	G. H. Panton*	1,118 0 0
J. H. Fenwick	1,244 0 0		

[Architect's estimate, £1,240.]

ISLE OF CALDEY.—For erecting a row of cottages for the Rev. Father Abbot. Mr. J. Coates Carter, architect, Bank-buildings, St. Mary-street, Cardiff:—

—	Mason.	Carpenter.	Total.
	£ s. d.	£ s. d.	£ s. d.
Davies & Griffiths, Tenby & Pembroke Dock*	267 3 3	320 8 0	587 11 3
A. Heatherly	405 12 0	484 15 1	564 5 0
Hatherly & Co.	404 0 0	403 0 0	584 7 7
D. Davies & Sons	413 0 0	414 0 0	611 0 0
J. H. Maggs & Co.	373 12 1	368 12 5	615 9 1
Knox & Wells	472 0 0	403 0 0	671 0 0
C. Kelly		341 18 0	
Hare & Richards	430 5 0		
F. Beech	470 9 10	458 1 9	691 15 7

LEIGH-ON-SEA.—For alterations and additions to the Ship Inn, for the Baddow Brewery Co., Ltd. Messrs. C. & W. H. Pertwee, architects, The Institute, Chelmsford:—

F. Weight	£2,588 0	J. Gowers	£1,995 0
Baker & Sons	2,300 0	J. Smith & Son	1,993 0
Dowsing & Davis	2,270 0	J. C. Flaxman	1,987 0
J. Rayner	2,225 0	F. Davey	1,977 0
H. Potter & Son	2,217 0	W. E. Westgate	1,845 0
F. & E. Davey	2,137 0	G. Brown	1,795 0
R. Elvy	2,099 0	Edwards & Medway, Kennington Cross, London	1,744 0
J. Parren & Son	2,080 0		
F. & A. Wildmott	2,045 0		
S. E. Moss & Co.	1,998 10		

ISLE OF CALDEY.—For completion of guest house, for the Rev. Father Abbot. Mr. J. Coates Carter, architect, Bank-buildings, St. Mary-street, Cardiff:—

—	Gen. Cond. and Mason.	Carpenter.	Fittings.	Plumber.	Total.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Davis & Griffiths, Tenby and Pembroke Dock*	233 15 4	123 13 4	50 18 9	36 19 6	455 6 11
A. Heatherly	305 11 5	161 8 2	60 4 0	37 1 5	564 5 0
Heatherly & Co.	304 13 0	163 5 0	68 12 3	47 17 4	584 7 7
D. Davies & Sons	317 0 0	172 0 0	82 0 0	40 0 0	611 0 0
J. H. Maggs & Co.	300 8 1	190 4 7	85 13 10	39 2 7	615 9 1
Knox & Wells	378 0 0	172 0 0	69 10 0	51 10 0	671 0 0
C. Kelly	—	176 12 6	—	—	—
Hare & Richards	508 14 0	—	—	—	—
F. Beech	378 15 7½	211 2 6	1 5 10	30 11 7½	691 15 7

LIVERSEDGE.—For Smithie's Lane Improvement and Norristhorpe Lane Surface Drainage, for the Urban District Council. Mr. F. Langley, Engineer and Surveyor, Council Offices, Liversedge:—

J. Crossley	£1,139 3 0	Sidebottom & Brown	£827 17 7
Parkin & Co.	1,020 0 0	A. Graham & Sons	826 0 0
W. Waring & Sons	990 0 0	R. Naylor & Sons	814 18 0
S. Drake	899 10 0	W. Doleman, Dewsbury*	796 0 11
J. Brook	893 2 0		
J. Totty	863 4 0		
G. Horsfall & Son	839 0 0		

[Surveyor's estimate, 825*l.*]

LONDON.—For water tube boilers Greenwich generating station (second portion) for the London County Council:—

Thames Ironworks, Shipbuilding, & Engineering Co., Ltd.	£29,846
Clarke, Chapman, & Co., Ltd.	28,761
Stirling Boiler Co., Ltd.	28,632
Babcock & Wilcox, Ltd., London*	27,846
B. R. Rowland & Co., Ltd.	27,004
E. Danks & Co. (Oldbury), Ltd.	24,137

* Babcock & Wilcox, Ltd., to be allowed to sublet to the undermentioned firms (or to such other persons or firms as may be approved by the engineer under the contract), the following portions of the work specified in the forgoing resolution (*b*), namely (i) to H. Windsor & Co., Ltd., the brickwork setting (ii) to the Smoke Preventor Co., Ltd., the supply of the carbon dioxide apparatus, and (iii) to J. Hopkinson & Co., Ltd., the supply of the boiler mountings.

LONDON.—For alterations and additions to Archbishop Tenison's School Lambeth, for the Trustees. Messrs. Waring & Nicholson, architects, 38, Parliament-street, Westminster:—

T. Hooper & Son	£2,980	C. Ansell	£2,727
J. Appleby & Sons	2,900	Holliday & Greenwood, Ltd.	2,615
T. Lapthorne & Co.	2,878	W. Smith & Sons *	2,565
J. Marsland & Son	2,755		

LONDON.—For motor generators for sub-stations for the London County Council:—

Mather & Platt, Ltd.	£25,805 0
Dick, Kerr, & Co., Ltd.	25,374 0
Siemens Bros.' Dynamo Works, Ltd.	24,515 10
Phœnix Dynamo Manufacturing Co., Ltd.	23,407 0
British Thomson-Houston Co., Ltd.	22,494 14
British Westinghouse Electric and Manufacturing Co., Ltd.	21,575 0
Electric Construction Co., Ltd., Wolverhampton*	21,434 10
British Electric Plant Co., Ltd.	20,534 0
General Electric Co., Ltd.	19,907 0
Name omitted, Newcastle-on-Tyne‡	19,366 3

* The Electric Construction Co., Ltd., to be allowed to sub-let to E. F. Moy Ltd., (or to such other person or firm as may be approved by the chief officer of tramways under the contract), the supply of the rheostats and switches for the motor-generators, etc.

‡ Not to specification.

LONDON.—For low-tension switchboards for sub-stations for the London County Council:—

	Northern sub-stations.	Southern. sub-stations.
J. Sagnoletti & Co., London*	£3,336 0 0	£2,620 0 0
Edison & Swan United Electric Lighting Co., Ltd.	3,655 9 2	2,897 10 9
T. Bertram	3,698 0 0	2,737 7 0
Eckstein, Heap, & Co.	—	2,850 0 0
Evered & Co., Ltd.	3,711 17 0	2,851 16 0
Whipp & Bourne	3,744 2 2	2,885 8 8
Johnson & Philips, Ltd.	3,749 8 4	2,877 10 8
S. Dixon & Son, Ltd.	3,755 13 3	2,964 11 9
Cox-Walkers, Ltd.	4,057 0 0	2,940 0 0
General Electric Co., Ltd.	4,141 15 9	3,100 19 3
Kelvin & J. White, Ltd.	4,396 11 2	3,441 8 10
Electric Construction Co., Ltd.	4,665 8 0	3,612 11 0
Ferranti, Ltd.	4,897 13 6	3,731 0 0
British Westinghouse Electric & Manufacturing Co., Ltd.	4,966 8 0	3,495 11 0
Universal Electrical Manufacturing Co.	5,908 0 0	4,334 0 0

* Messrs. J. Spagnoletti & Co., to be allowed to sub-let to the undermentiond firms (or to such other persons or firms as may be approved by the chief officer of tramways under the contract), the following portions of the works *b* namely, (i) to the I. T. E. Co., the supply of the circuit breakers, and (ii) to Messrs. Elliot Brothers, London, the supply of the recording meters.

LONDON.—For laying stoneware cable-ducts, etc., for London County Council:—

	North of Thames.	South of Thames.
J. A. Ewart, London, S.W.*	£35,240 11 8	£27,173 2 9
Reid Bros., London, N.†	36,513 4 0	26,623 0 7
D. R. Paterson	36,974 4 2	30 217 0 0
W. Muirhead & Co.	38,994 0 0	28,115 0 0
J. Mowlem & Co., Ltd.	—	28,486 0 0
Greig & Matthews	44,234 2 7	33,901 2 3
J. Moran & Son, Ltd.	49,239 13 5	46,000 0 0

* Mr. J. A. Ewart to be allowed to sub-let to James Gibb & Co., Ltd., London (or to such other person or firm as may be approved by the chief officer of tramways under the contract), the supply of the manhole covers and frames in connexion with the laying of cable-ducts referred to.

† Messrs. Reid Brothers to be allowed to sub-let to Mr. J. A. Law, of Glasgow, and Messrs. Stone & Co., of London (or to such other persons or firms as may be approved by the chief officer of tramways under the contract), the cast-iron work in connexion with the laying of cable-ducts referred to.

LONDON.—For additional plant for sub-stations—cables, cleats, etc., for motor generators for the London County Council:—

British Insulated & Helsby Cables Ltd.	£953 10 2
Siemens Bros., Dynamo Works Ltd.	927 5 3
W. T. Henley's Telegraph Works Co., Ltd.	924 17 2
Western Electric Co., London*	900 2 4

LONDON.—For supply of stoneware cable-ducts for the London County Council:—

—	No. of ducts tendering for.	Rate a 1,000 ducts.	Amount of tender, including provisional sum of £100 for contingencies.
		£ s. d.	£ s. d.
Donnington Sanitary Pipe & Fire Brick Co., Ltd., Moira, nr Ashby-de-la-Zouch*	100,000	15 0 0	1,600 0 0
Doulton & Co., Ltd., London*	100,000	15 0 0	1,600 0 0
Ensor & Co., Ltd., Woodville, near Burton-on-Trent* ‡	100,000	15 0 0	1,600 0 0
Gibbs & Canning, Tamworth* §	100,000	15 0 0	1,600 0 0
Robinson & Dowler, Overseal, near Ashby-de-la-Zouch* ‖	100,000	15 0 0	1,600 0 0
H. R. Mansfield	100,000	15 0 0	1,600 0 0
Sutton & Co.	100,000	15 0 0	1,600 0 0
Hosea Tugby & Co., Ltd.	100,000	15 0 0	1,600 0 0
G. Skey & Co., Ltd.	120,000	15 0 0	1,900 0 0
Stanley Bros., Ltd.	125,000	15 0 0	1,975 0 0
T. Wragg & Sons, Ltd.	125,000	15 0 0	1,975 0 0
J. Woodward, Ltd.	900,000	15 0 0	13,600 0 0
J. Crankshaw & Co., Ltd.	100,000	17 0 0	1,800 0 0
Sharp, Jones, & Co.	100,000	18 10 0	1,950 0 0
Albion Clay Co., Ltd.	900,000 (not to specification).	25 0 0 less 2½ per cent. discount.	22,600 0 0

‡ Ensor & Co., Ltd., to be allowed to sublet to Messrs. Robinson & Dowler, of Overseal, Ashby-de-la-Zouch (or to such other person or firm as may be approved by the chief officer of tramways under the contract), the manufacture of the ducts to be supplied by the first-named firm.

§ Messrs. Gibbs & Canning to be allowed to sublet to G. Skey & Co., Ltd., of Tamworth, or Stanley Bros., Ltd., of Nuneaton (or to persons or firms to be approved by the ch ief officer of tramways under the contract), the manufacture of the ducts to be supplied by the first-named firm.

‖ Messrs. Robinson & Dowler to be allowed to sublet to such persons or firms as may be approved by the chief officer of tramways under the contract, the manufacture of the ducts to be supplied by the firm above-named.

LONDON.—For fitting shop No. 2, Chadworth-buildings, Garden-row Estate, for the London County Council:—

Samuel Haskins & Bros.	£135 0
F. Sage & Co. (1905), Ltd.	127 10
C. Wall, Ltd.	85 0
W. H. Lascelles & Co., Ltd., London*	82 0

LONDON.—For additional plant for sub-stations and switch-gear for Battersea sub-station, for the London County Council:—

Dick, Kerr, & Co., Ltd.	£646 0 0
Ferranti, Ltd., Hollinwood, Lancashire*	562 18 6

LONDON.—For repair of pumps Abbey Mills pumping station, for the London County Council:—

The Thames Iron Works, etc., Co., Ltd.	£161 7 6
Hunter & English	156 0 0
Seagers, Ltd., Dartford*	132 0 0

LONDON.—For laying-out of forecourt garden, Briscoe-buildings, Brixton-hill for the London County Council:—

Holloway Bros., Ltd.	£245 0	J. & C. Bowyer	£210 15
W. Vogel Goad	230 0	R. Harding & Son, Brixton*	206 10
F. & H. F. Higgs	212 0		

LONDON.—For hot-water supply and cooking apparatus at Orsett Union, Orsett, Essex. Mr. Christopher M. Shiner, A.R.I.B.A., architect:—

Benham & Sons	£792 16	Barford & Perkins‡	£733 16
Wenham & Waters	740 7		

‡ Recommended for acceptance.

LONDON.—For additional switchgear, etc., Elephant and Castle substation, for the London County Council:—

British Westinghouse Electric and Manufacturing Co., Ltd.	£1,188 0
Eckstein, Heap, & Co.	1,005 6
B. Thomas	877 16
Evered & Co., Ltd. Smethwick*	874 6

LONDON.—For the erection of new class-rooms and hall at the Stepney Jewish Schools, Stepney Green, for the managers of the Stepney Jewish Schools. Messrs. Joseph & Smithem, 83, Queen-street, Cheapside, E.C. Quantities by Mr. C. W. Latter, of 14, Great James-street, W.C.:—

Second Contract.

Beale & Sons	£5,992	Higgs & Hill	£5,044
Ashby & Horner	5,390	Simpson & Sons	4,950
G. Barker	5 330	Wallis & Son*	4,863
Senecal & Co.	5,077	Sabey & Son	4,820

Hot Water Work.

W. G. Cannon & Sons*	£405

Artificial Stonework, Granolithic Steps, and Pavings.

J. Bickley*	£504

MARSHFIELD.—For alterations and additions to "Lockwood," for Mrs. Rowlands. Mr. W. H. Dashwood Caple, F.R.I.B.A., 2, Church-street, Cardiff. Quantities by architect:—

F. Small	£360 0 0	Fursey & Harris	£250 0 0
J. Charles	321 0 0	J. H. Williams	237 10 0
C. Totterdel	278 5 0	G. F. Leadbeter, Newport, Mon.*	215 13 0
E. D. W. Evans	277 18 3		
F. C. Williams	276 17 9		

NORWICH.—For external painting of various provided schools, for the Education Committee. Mr. C. J. Brown, Architect and Surveyor, Cathedral Offices, the Close, Norwich:—

Angel-road School.

Lawn & Blyth, Farmers-avenue, Norwich	£43 14

Avenue-road School.

R. F. Hipperson, Northumberland-street, Norwich	40 12

Bull Close-road School.

G. Marshall, 56, Heath-road, Norwich	17 10

Quay-side School.

R. F. Hipperson, Northumberland-street, Norwich	16 17

Rosebery-road School.

T. Horth, Magdalen-street, Norwich	12 5

St. Paul's.

T. Tidy, Magdalen-street, Norwich	10 10

Thorpe Hamlet School.

J. W. King, 58, Grove-road, Norwich	37 0

STOKE-ON-TRENT.—For extension of Chromo Transfer Works. Messrs. A. R. Wood & Sons, architects, Tunstall and Burslem:—

Townser & Son	£2,399	Tompkinson & Bettelly	£2,147
S. Heath	2,322	W. Grant & Son	2,100
J. Cooke	2,300	Micklejohn	2,014
S. Walton, jun.	2,200	C. Cornes & Son	2,000
W. Cooke & Son	2,175	J. Godwin, Hanley*	2,000
J. W. Boirdley	2,150		

SURBITON.—For reconstructing drains, Cleveland-road, for the Urban District Council. Mr. W. Nesfield, Sanitary Inspector:—

W. Rice & Sons	£142 6 10	Scase & Son	£113 14 0
McDonald Bros.	139 10 0	E. Scase	112 10 0
T. Johnson	126 0 0	S. Lane	112 7 0
W. H. Gaze & Sons	125 10 0	J. Turner	106 1 0
H. & A. C. Soan	125 0 0	R. O. Roberts, Hampton Lodge, Hampton-hill*	88 17 0
A. W. Reading	123 4 3		
C. Butcher	119 0 0		

TOTNES.—For erecting a permanent grand stand, for Totnes and Bridgetown Race Committee. Mr. W. F. Tollit, architect and surveyor, 10, High-street, Totnes:—

Wilkins & Sons	£974 0	T. Brook	£545 0
F. J. Badcock	570 0	Kinsman Bros., Totnes*	510 0
W. Rees & Sons	558 9		

[The ironwork has been let to Messrs. David Rowell & Co., 31, Old Queen-street, Westminster, W., at £513 10s.]

WALSALL.—For alterations and additions to the Congregational Church, Ryecroft. Messrs. Bailey & McConnal, architects, Bridge-street, Walsall. Quantities by architects:—

W. Wistance	£498 0 0	G. Insley	£425 0 0
Letts & Airston	478 3 0	J. Hall & Son	426 0 0
W. Kendrick & Son	478 10 0	S. Wootton	424 10 0
Brockhurst & Wood	442 0 0	J. & F. Wootton, Bloxwich*	388 5 6

WARMINSTER.—For additions to The Buries, for Mr. Gratney R. Z. Erskine. Messrs. Long & Glass, architects, 55, Market-place, Warminster. Quantities by the architects:—

J. Long & Sons	£1,840 0	W. Moody	£1,600 0
F. J. Amery	1,769 0	A. J. Colborne	1,588 10
Downing & Rudman	1,760 0	A. L. Ponton	1,560 0
F. Curtis & Son	1,719 0	E. Linzey	1,470 0
G. Moore	1,705 0	R. Butcher & Son, Warminster*	1,377 14
Parsons Bros.	1,627 10		

WHEATLEY HILL.—For erecting a curatage for the Building Committee. Mr. J. Garry, F.R.I.B.A., 47, Church-street, West Hartlepool. Quantities by architect:—

G. T. Manners	£569 15 0	E. M. Tweddle, West Hartlepool*	£497 8 10
J. W. Moore	538 12 0		
W. T. Atkinson	526 4 2		
H. C. Howe	499 16 5		

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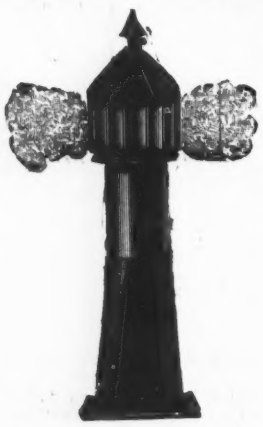

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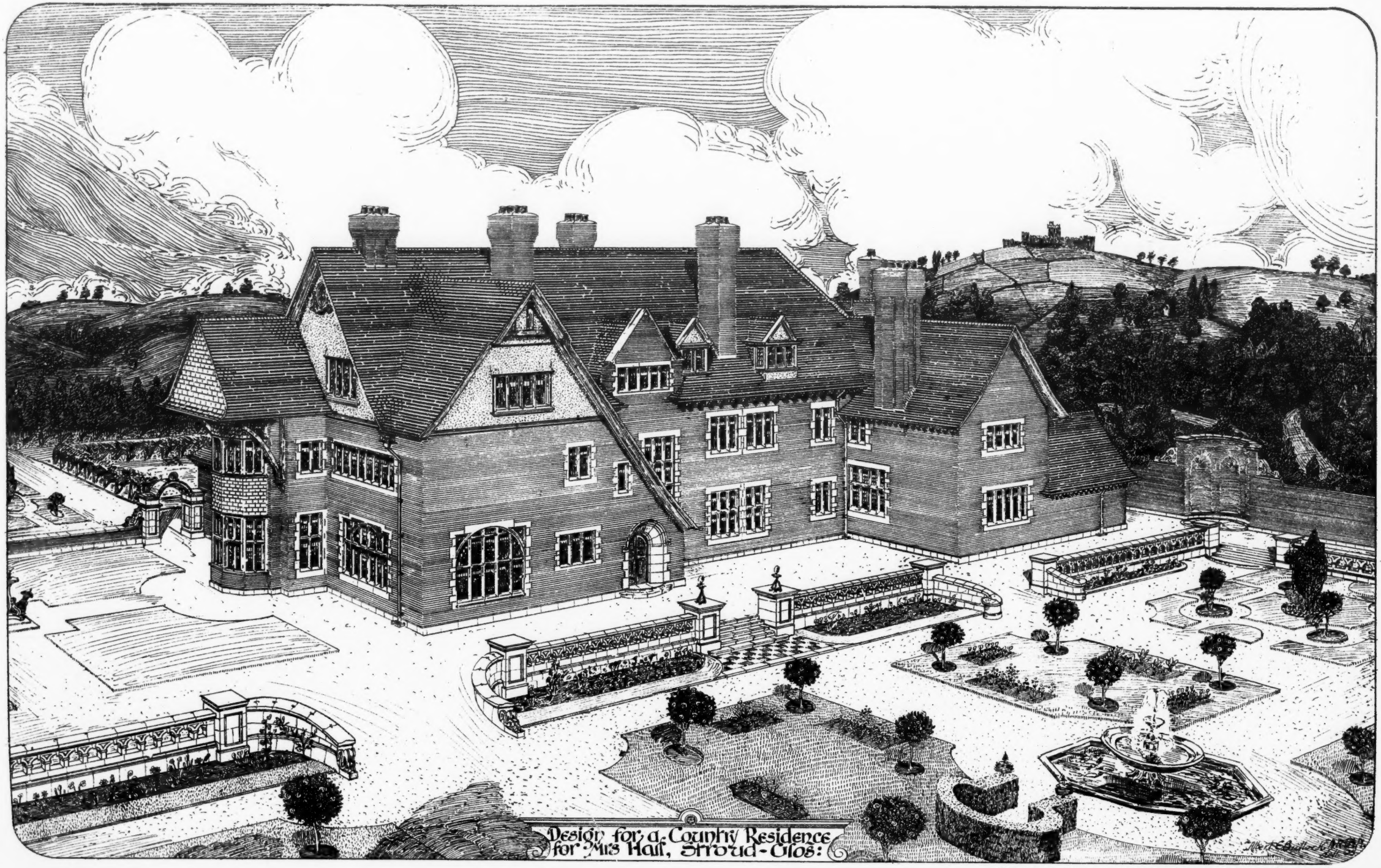

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HOUSE IN GLOUCESTERSHIRE.—Mr. Albert E. Bullock, A.R.I.B.A., Architect.

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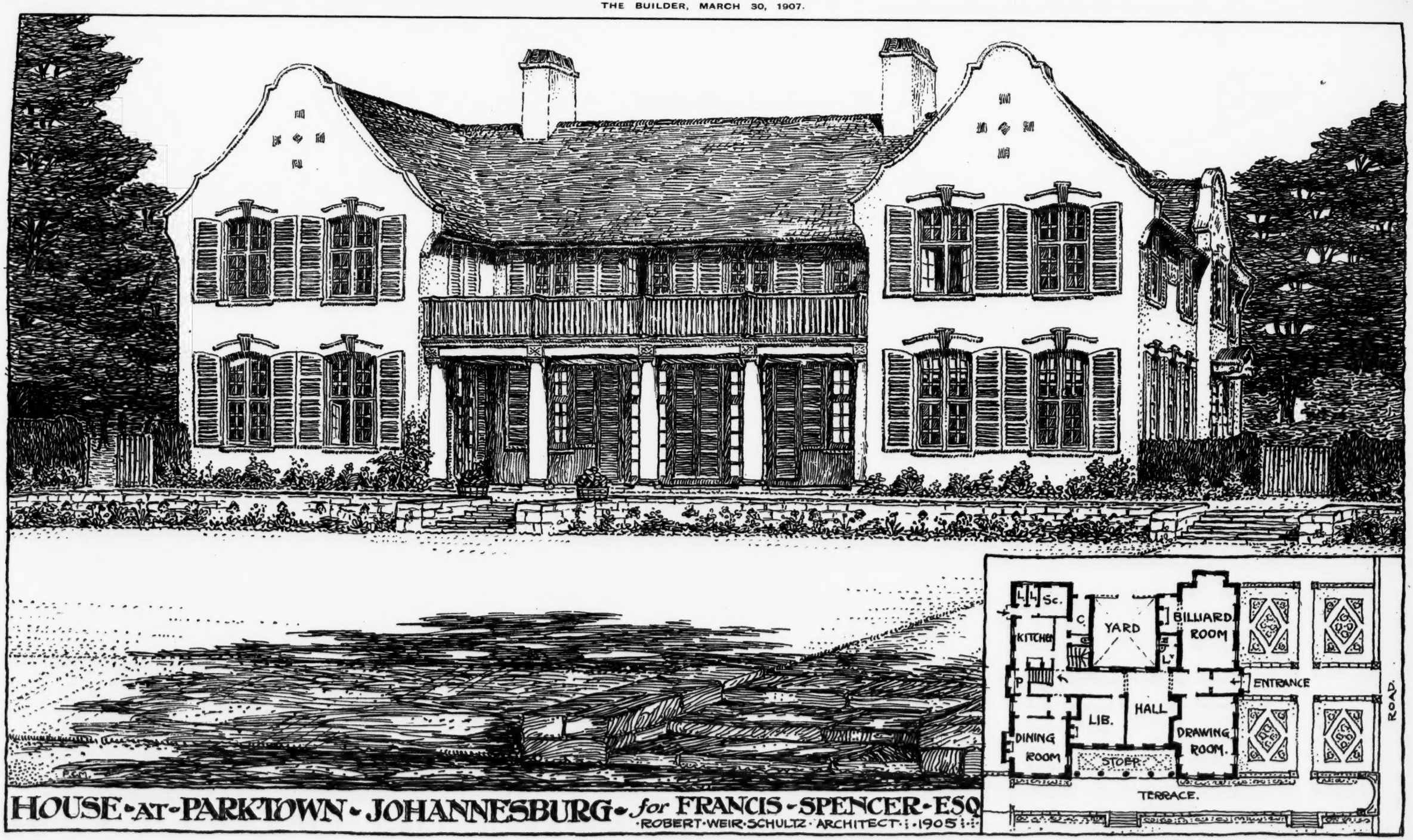

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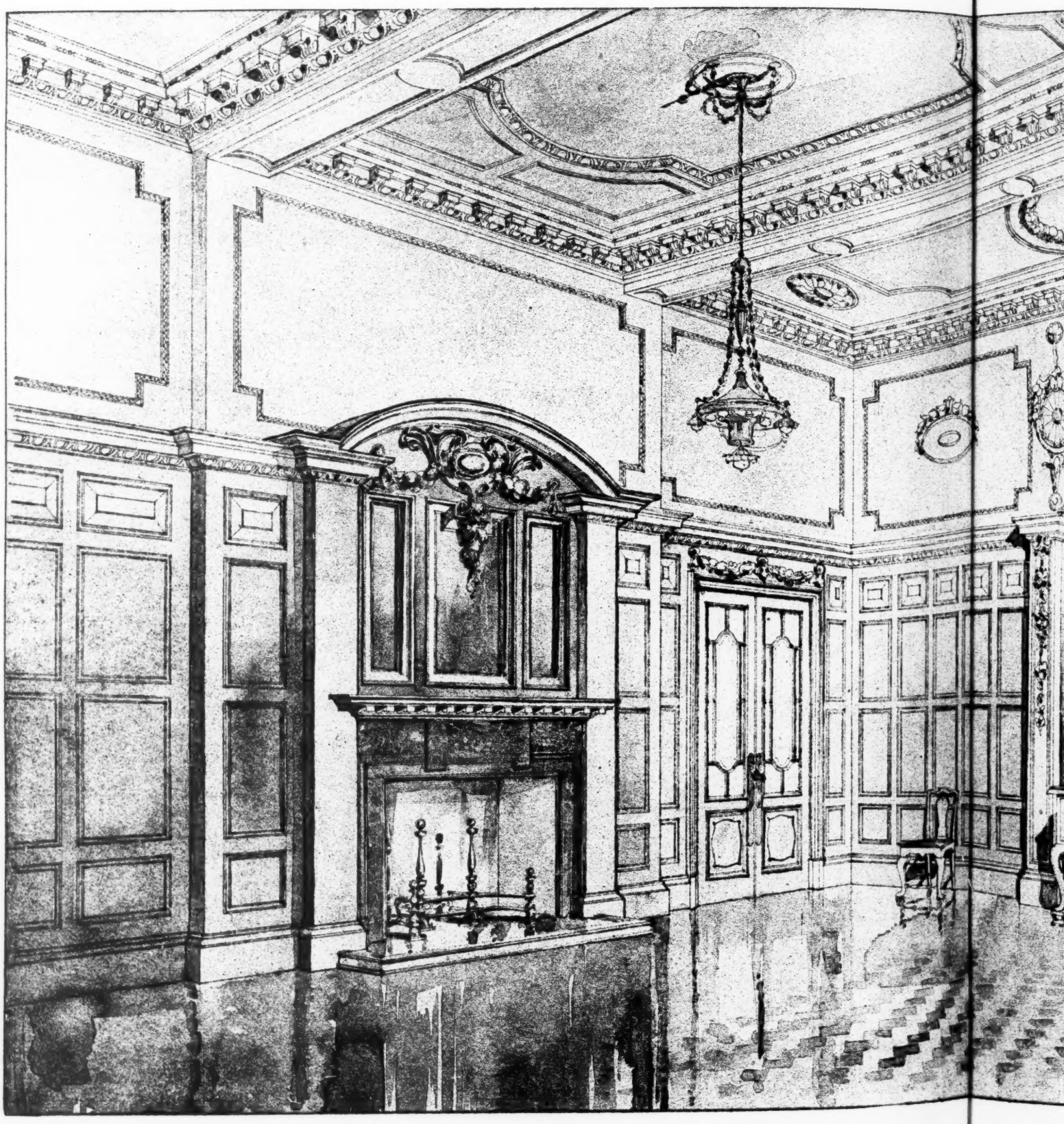

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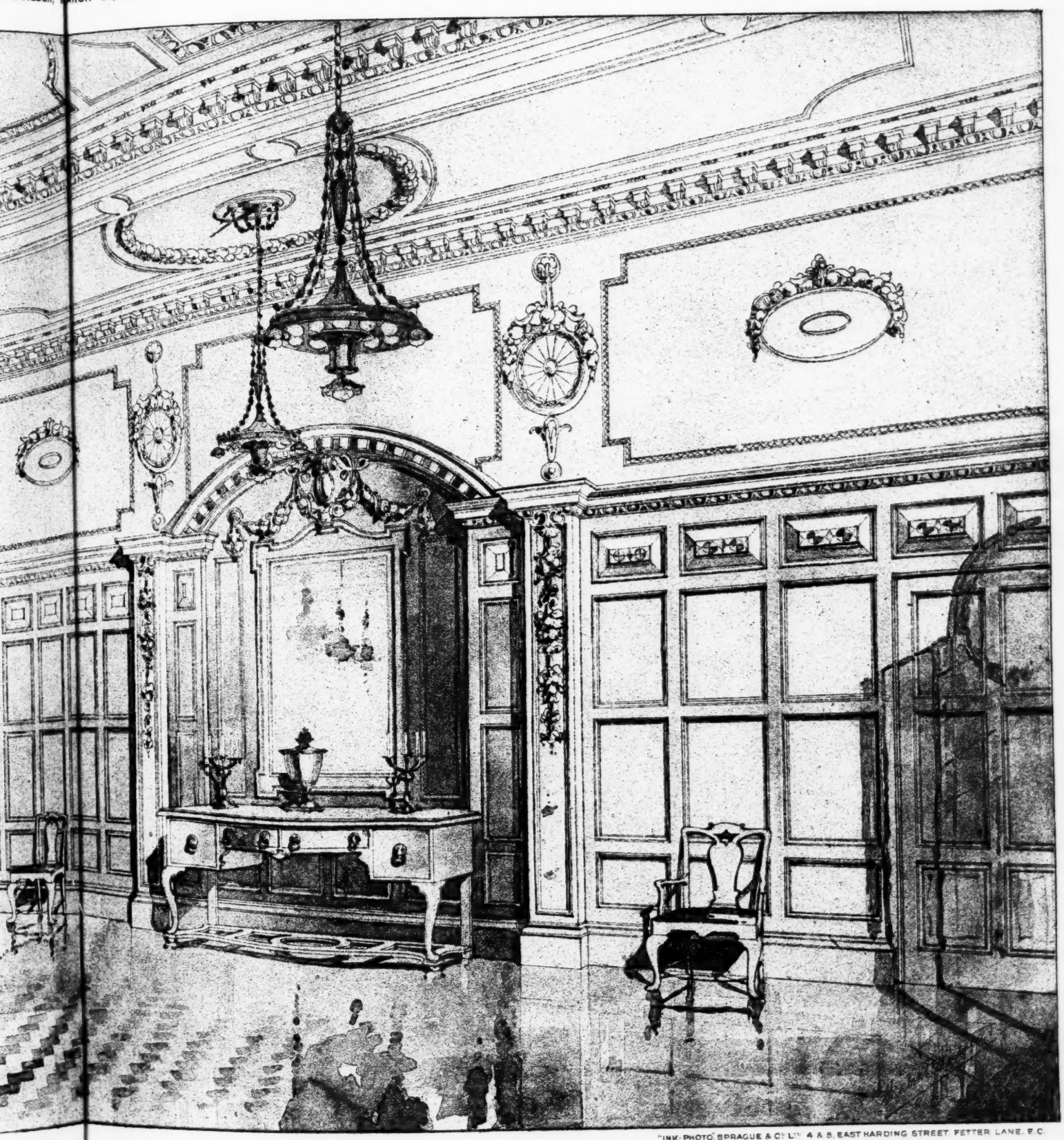

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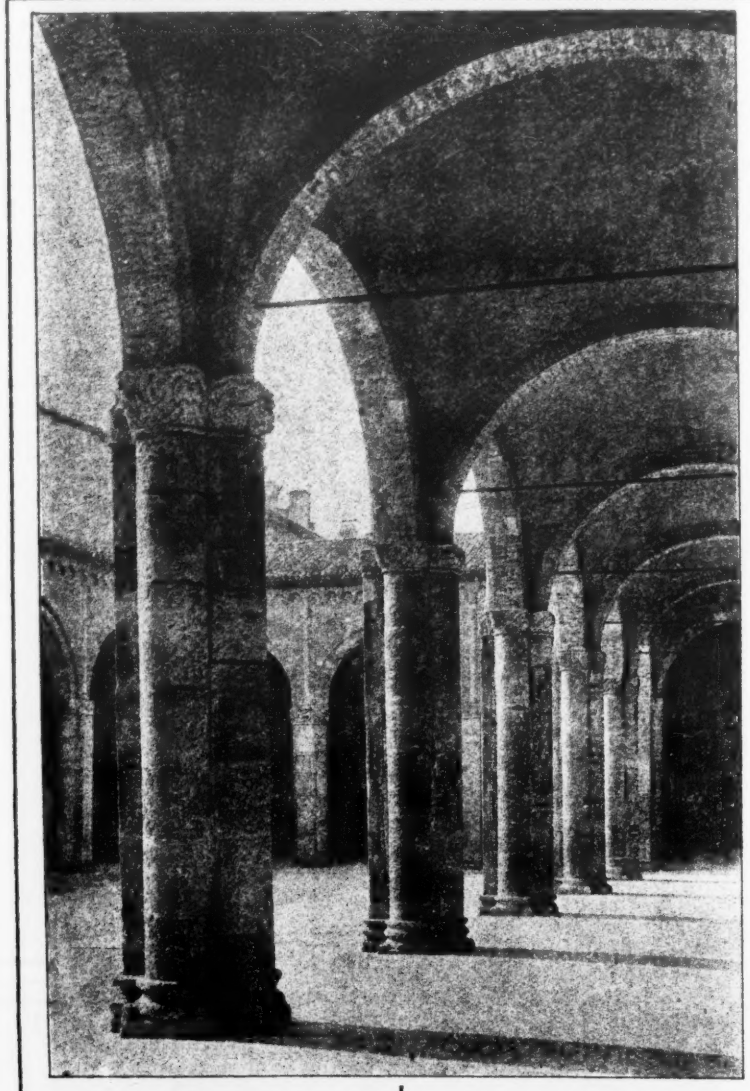

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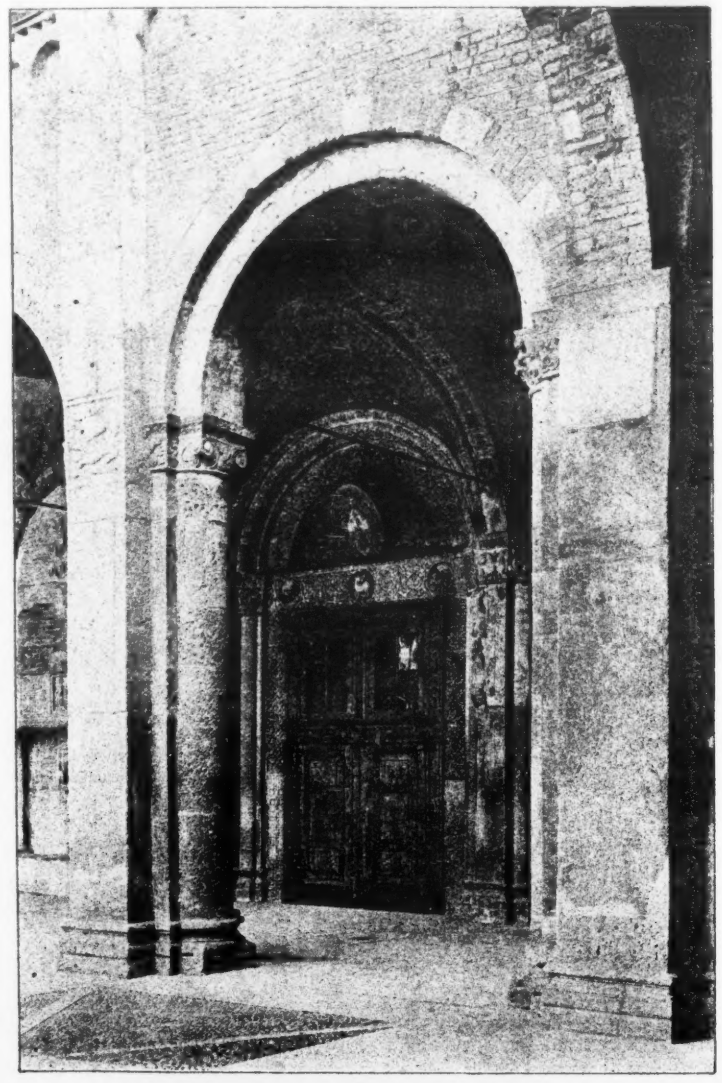

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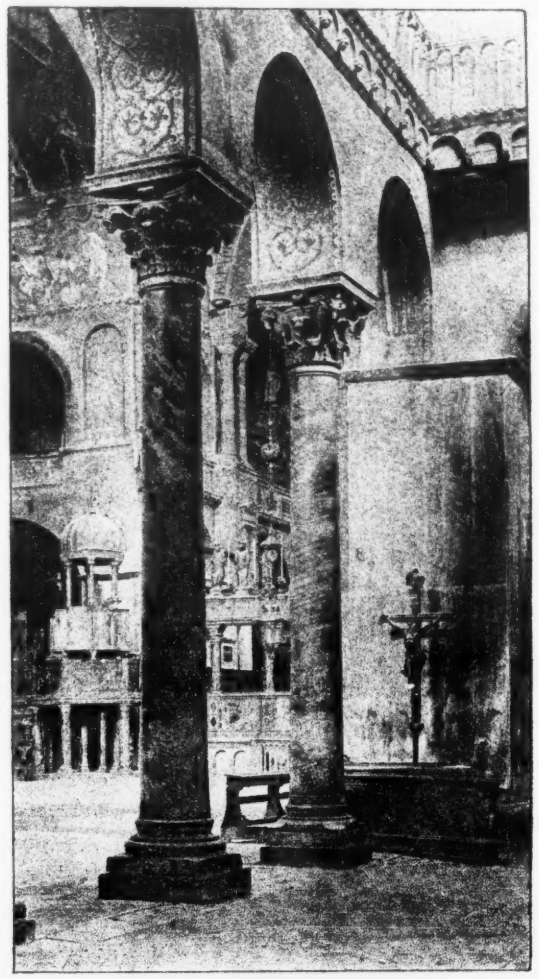

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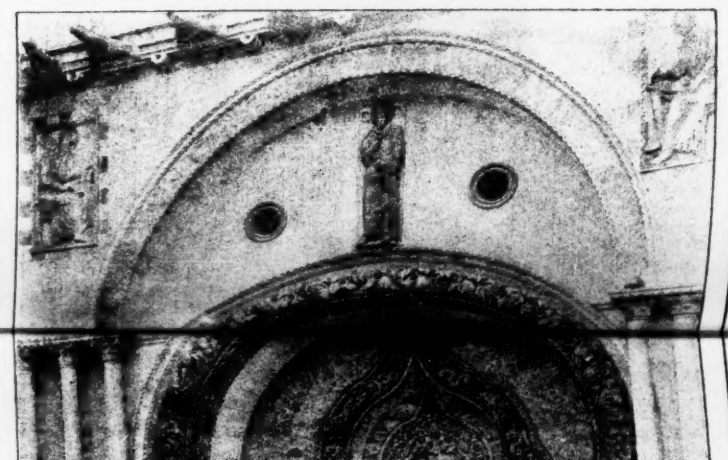

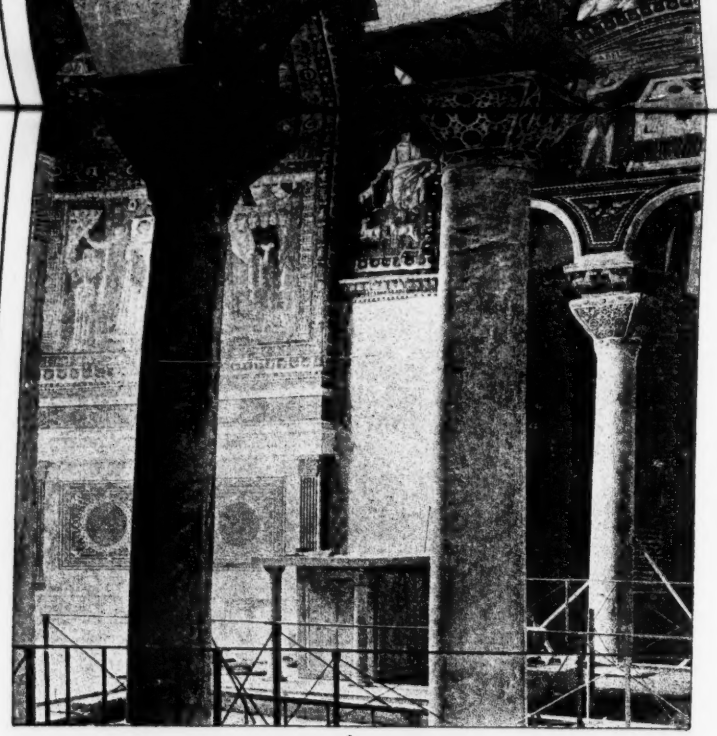

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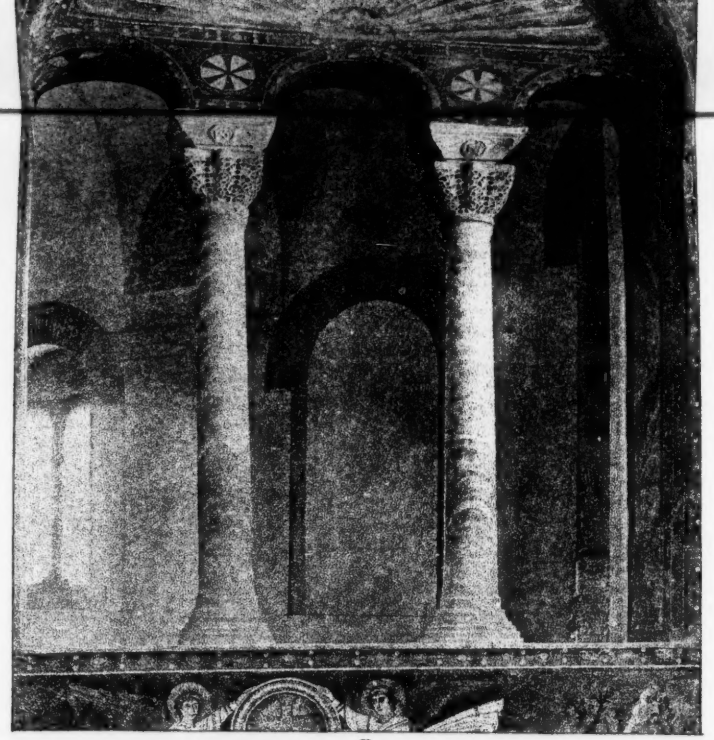

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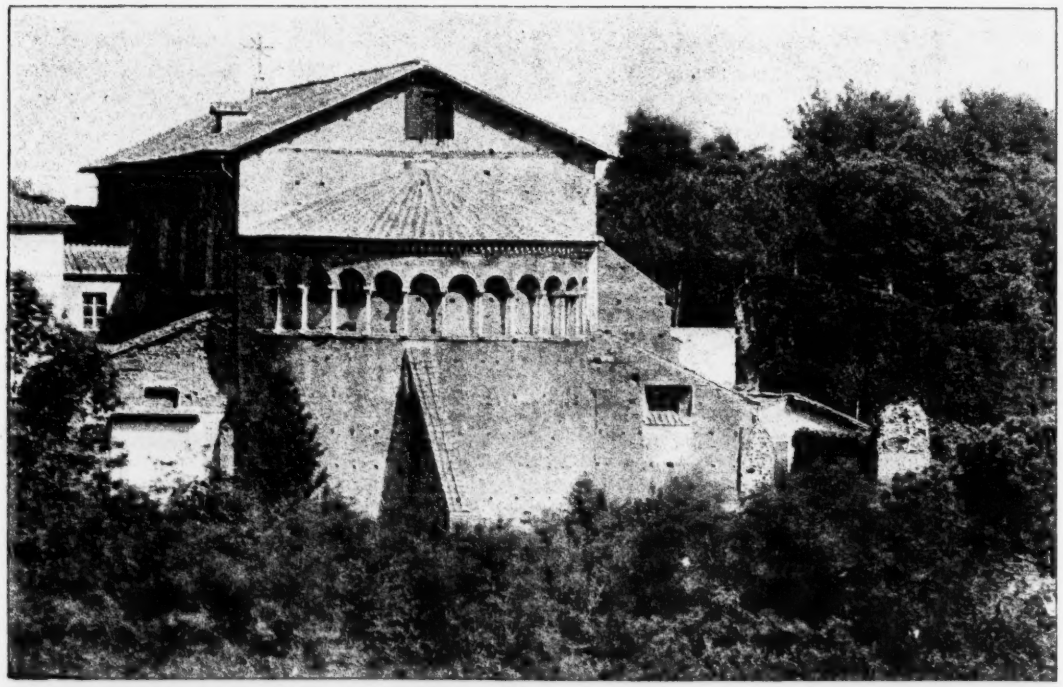

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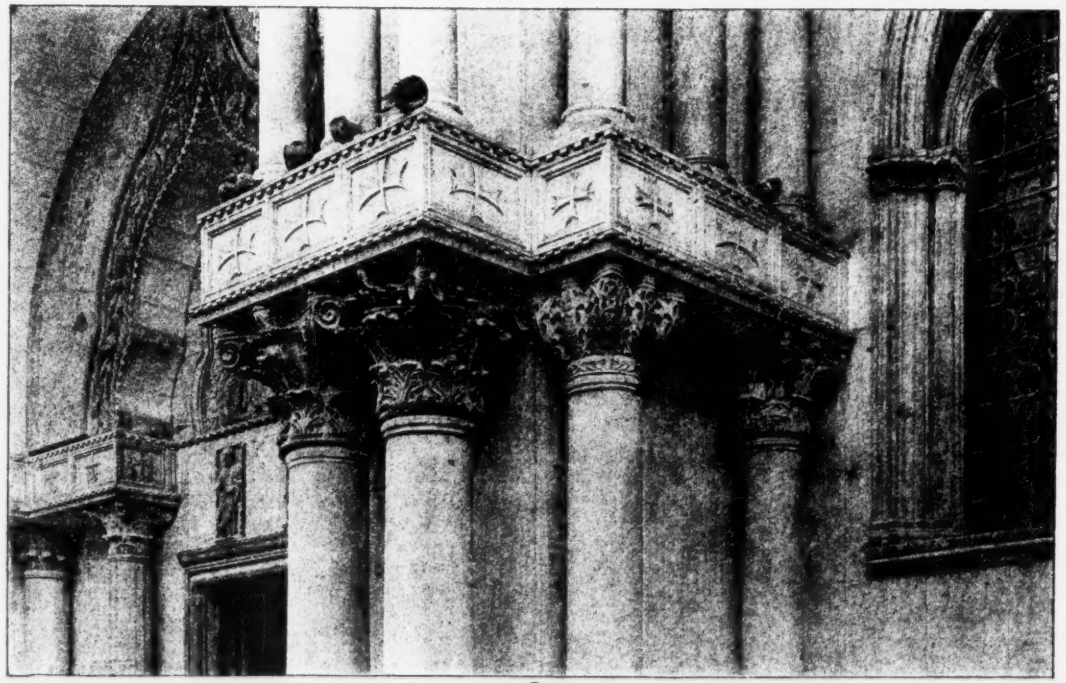

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